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A Machine for Testing the Strength of Metals, etc.*

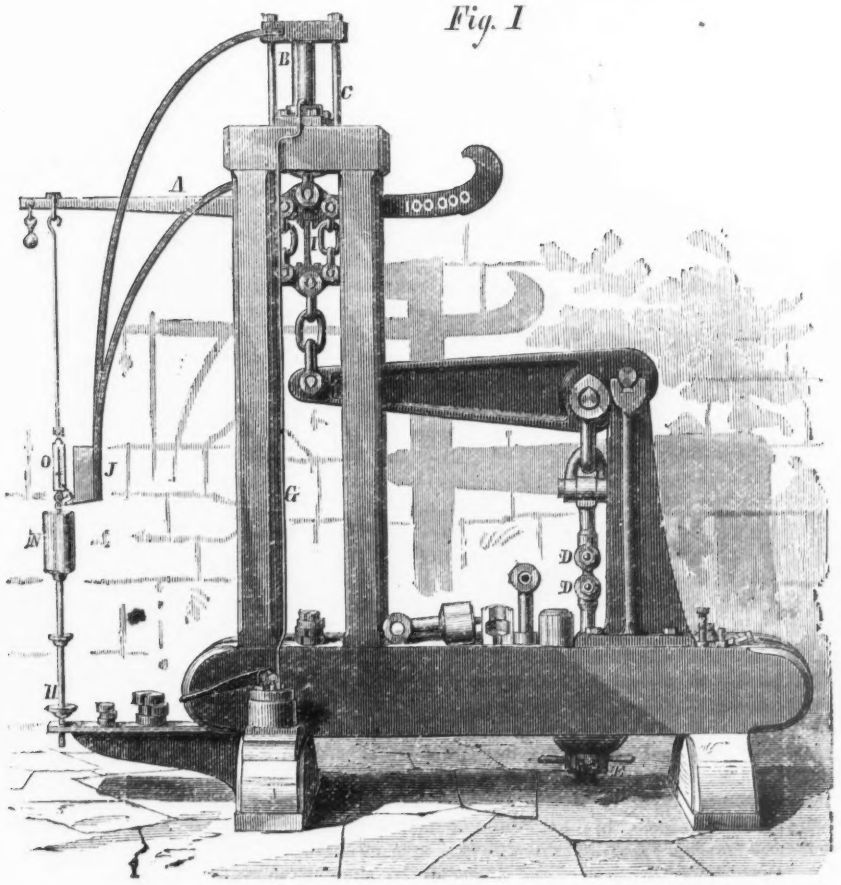
BY THOMAS M. DROWN.

The Messrs. RIEHLE BROTHERS of this city (Philadelphia,) have designed and constructed a machine for testing the strength of metals, which without undue complexity, affords results of unusual accuracy.

It consists essentially of a hydraulic pump and jack, by which the strain is applied, and a scale beam on which the strain is measured.

Fig. 1 represents a machine of 100,000 lbs. capacity. The crane A is suspended from the jack B by a yoke C, and connected with the small end of the main lever by means of a clevis. The piece of metal to be tested is fastened in the clutches D D, and the weights are laid upon a disc H, on a rod suspended from the end of the scale beam. The pump at the base of the machine is connected with the jack by the tube G. All the bearing points of the machine rest on steel knife edges, and when ready for operating the whole machine is in perfect equipoise, and so nicely adjusted that a half-ounce weight on the disc H is sufficient to turn the beam.

Fig. 1



In order to obtain a very accurate result an ingenious arrangement has been devised, whereby the weights are added automatically toward the end of the operation in the form of small shot. The arrangement for this purpose consists of a reservoir of shot J, (see fig. 2), attached firmly to the frame work of the machine. This reservoir is provided with a valve M at its base, which is opened by a pin on the beam rod when the beam rises, thus allowing shot to run out. When the beam falls the valve closes by its own weight and the flow of shot ceases. The shot as they flow from the reservoir are received in a vessel N, suspended from a spring-balance O hung on a pin on the beam rod.

In operating the machine the slack is first taken up by a screw and nut at E. Strain is then applied by pumping and the equilibrium maintained by placing weights on the disc H. When a point has been reached within 5,000 to 10,000 lbs. of the supposed breaking strain of the test piece no more weights are placed on the disc, but the additional strain is measured by the automatic flow of shot from the reservoir into the receptacle on the beam rod. After the rupture of the test piece the strain employed is ascertained by adding the weight of shot (shown on the spring balance) to the weights on the disc.

Fig. 3 represents the form of round test-piece used in the case of cast iron, etc. Figure 4 the form used in case of boiler plate.

By means of suitable tools and appliances this machine is equally adapted to the application of torsional and crushing strain.

Fig. 2

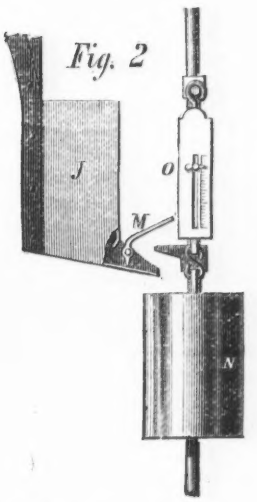


Fig. 3

ROUND TEST PIECE

Fig. 4

BOILER PLATE TEST PIECE

A MACHINE FOR TESTING THE STRENGTH OF METALS, ETC.

* A paper read before the American Institute of Mining Engineers. Feb. 21st, 1872.

Amalgamation of Silver Ores in Pans, with the Aid of Chemicals.

THE attention of the mining public has, within late years, been largely attracted to the existence of numerous veins and deposits of silver ore, the beneficiation of which was, however, apparently impracticable, as the ores they furnish cannot be worked with any degree of success by the ordinary amalgamation process, and are not sufficiently rich to bear the expense of roasting, even after the improved and cheaper methods now in vogue. An overconfidence in the adaptability of the ordinary Washoe process to the working of ores of the most different characters has led to numerous failures, while, on the other hand, the caution bred of experience causes many properties to lie idle, which would prove remunerative under a method of treatment equal in thoroughness to the ordinary process, without greatly exceeding it in expense. The demand for such a process has within the last three years been practically filled, but the suspicion with which all innovations are regarded, and the uninvestigative spirit of the "practical" millman have prevented this new method from being more generally known and adopted. The facts now set forth should demonstrate its usefulness beyond a question. A test of its merits can be readily made. Simple as it appears, it can be made to solve many metallurgical and financial problems in the way of working ores to a fair percentage of their value, and with profit, which hitherto have, by their apparent rebelliousness, proven only sources of loss.

The first successful attempt at amalgamating rebellious silver minerals in pans and without roast-

ing was made on the Comstock slimes. By far the greater portion of these slimes was in former years allowed to run to waste. This loss was probably looked upon as an evil unavoidable in wet crushing mills, and was partially excused by the fact that not more than 35 per cent. of their gross value could be extracted by the then known methods of treatment. There was consequently but little inducement to millmen to save slimes assaying $40 per ton, or thereabout, as they could barely be worked to a profit. Thousands of tons were thus lost, which at the present day would yield an enormous fortune to their owner.

Some three years ago a series of experiments were made, which clearly proved that these slimes could be worked to a high percentage at a cost which, though greater than that of ordinary milling, still left a good margin for profit. Mill owners were induced to save and sell what they had hitherto allowed to run waste, and shortly after the working of slimes became a distinct feature of milling on the Comstock.

All this was effected simply by adapting to the Washoe pan process certain features of the Mexican patio—namely, the use of sulphate of copper and salt in sufficient quantities to decompose the rebellious silver minerals and leave them in a favorable state for amalgamation. The successful application of these chemicals to the ordinary Washoe process was entirely novel. It is true that in former years many millmen had tried these chemicals among a host of others, but their experiments were invariably carried on with such a want of knowledge that failure was inevitable. Some used bluestone without salt, and others salt without bluestone. When the two were used simultaneously, the amount was so small that the effect could not be appreciated. At the time referred to it was a maxim among millmen that no benefit was to be derived from the use of chemicals. Mr. KÜSTEL, in his book on the Washoe process, after giving a list of different chemicals employed or recommended—none of which were probably ever largely adopted—expresses strong doubts as to the efficacy of any or all chemicals; and in a later article, after admitting the extraordinary effects obtained on slimes, states that the same process would not be applicable to sands. So much to vindicate the practical originality of this process. It will be shown further on that it can be applied with equal advantage to the working of sands and tailings. There is no certainty as to the formulæ in obedience to which the chloride of copper—which is formed by the mutual action of salt and sulphate of copper—effects its purpose. Chemists are not agreed as to the various reactions, and the subject is still under dispute. Its theoretical comprehension is, however, not essential to the practical operations which will be described.

We will first consider the application of chloride of copper to the working of slimes, and later its extension to the treatment of sands or pulp.

Slimes constitute the clayey portion of the ore which flows from the battery in wet crushing mills, and is imperfectly caught or settled in the tanks constructed for the purpose of catching the crushed ore. It is needless to say that with a sufficient number of tanks these slimes could be saved, but lack of space generally render this impracticable, and the usual plan is to allow them to flow into reservoirs outside of the mill, from which they are afterwards dug out, allowed to dry, and hauled to the mill.

The mechanical treatment of slimes varies but little from that of ordinary ore. Their finely divided condition renders grinding unnecessary, and calls merely for a sufficiently violent motion to thoroughly incorporate the quicksilver with the pulp.

The length of time devoted to the amalgamation of a charge of ore is influenced to a great extent by the amalgamating capacity of the mill, and by various reasons of economy. It often becomes advisable to sacrifice a certain percentage of the value for the sake of working a greater number of tons per diem. To ensure good results a charge should not remain in the pan, subject to the action of quicksilver and chemicals, less than six to seven hours.

In working ordinary ores the quicksilver is not added until the pulp has been thoroughly ground. This is to prevent the flouring of the quicksilver, but since slimes require no grinding, one might suppose that it would be more advantageous to put the quicksilver into the pan on charging, thus allowing more time to the amalgamation.

Experience has, however, shown that better results are obtained by putting in the chemicals—*i. e.*, sulphate of copper and salt first, and adding the quicksilver from two to three hours later, thus allowing the intervening length of time for the decomposition or "preparation" of the refractory minerals. The reason of this is not immediately apparent, as the quicksilver charged simultaneously with the chemicals should attack the chlorodized (?) silver minerals in *statu nascenti*. The amount per ton of chemicals employed varies with the richness of the slimes. The quantity is always largely in excess of that called for by the chemical equivalents of the minerals to be acted upon, but in very large pans the relative proportions may be diminished. Taking ordinary slimes assaying thirty dollars per ton as a basis, the average quantities of sulphate of copper and salt employed per ton are 10-12 pounds of the former and 20-25 pounds of the latter.

These quantities may be advantageously increased on slimes of higher grade. The exact amounts must be determined by conscientious assays. In working slimes of uniform character the varying fineness of the bullion furnishes an excellent empirical test of the amount of chemicals to be employed. The baseness of the bullion increases with the quantity of sulphate of copper used, owing to the precipitation of copper by the iron of the pan and its consequent amalgamation. The millman soon discovers that beyond a certain point an excess of sulphate of copper produces no adequate results besides reducing the fineness of his bullion. Having once determined the average fineness of his bullion when working under the most favorable circumstances, he increases or diminishes the amount of sulphate of copper as the bullion becomes finer or baser than his standard.

The same amount of chemicals with richer slimes will produce finer amalgam, which is due to the fact that a larger amount of silver is amalgamated whilst the same percentage of copper is precipitated. Should the value of the slimes and consequent fineness of the bullion increase materially it becomes necessary to determine by assay the most advantageous proportion, and to adopt a new standard of fineness. A source of great expense in the working of slimes is the excessive and apparently unavoidable loss of quicksilver. Working with all the advantages of settlers and agitators, this loss seldom falls below four pounds per ton, whereas in quartz mills it does not as a rule exceed 1¼–1½ pounds per ton of ore. This is undoubtedly due to the nature of the slimes, which have the same effect upon the quicksilver as oil or grease, forming a film or coating over the surface of the metal, and preventing the globules from uniting. The minute particles settle with difficulty, and to a great extent flow off with the tailings. The excessive loss in working slimes cannot with justice be ascribed to the action of chloride of copper, as in working the tailings by the same process the loss of quicksilver per ton is not greater than in ordinary quartz mills, thus proving sufficiently that the deleterious action of chloride of copper upon quicksilver is not appreciable upon so large a scale.

Many attempts have been made to effect a saving of quicksilver in milling, but so far only mechanical appliances have met with success. Although sodium, sodium amalgam, cyanide of potassium, etc., are very effective in temporarily enlivening the quicksilver, their action speedily dies out after the latter has been transferred to the pan, and experience has sufficiently demonstrated that when employed in practicable quantities they have no effect in aiding the amalgamation. The only thorough method of cleansing quicksilver is to retort it, and the use of proper straining sacks will render a recourse to the method unnecessary.

TO BE CONTINUED.

Metrological Reform.

President BARNARD, of Columbia College, spoke before the Polytechnic Club of the American Institute, on Friday evening, April 12, on "The Present State of the Question of Metrological Reform." The following is an outline of his remarks:

When we speak of the *present* state of anything, we imply that the present state differs from the past. In order to be intelligible, therefore, we must inquire what the past has been. Accordingly, looking back upon the condition of the metrology of the world as it was a century ago, we find it to have been marked by these two characteristics: 1st, Great diversity of systems when different countries, different provinces, different districts, or even different towns are compared. 2nd, Exceeding confusion, when the weights and measures of any single country, province, district or town are considered by themselves. That different political communities should have different systems was a matter of course, considering how entirely without forethought or method all early systems were built up. The vast number of these divers systems is a consequence of the smallness of the populations who maintained an independent political existence in the earlier period of the history of civilization. Scripture history shows us that, within the small limits of Palestine, there were numerous kings waging war against each other and against the Israelites. In the early years of Rome, the bitterest wars were waged with peoples whose capitals were scarcely a day's march from the city of the seven hills. England had her heptarchy before the Norman conquest; and during the middle ages all Europe was parcelled out among an infinite number of petty princes, dukes, barons, and bishops with secular rule.

Every one of these independent petty States had their distinct systems of weight and measure. The variety was endless, and yet all evidently grew up in substantially the same way. This is proved by the fact that the linear measures everywhere had the same *names*, though very different values, and that these names are derived from the human person. Thus we have more than a hundred different foot measures, and nearly as many ell measures (derived from *ulna*, elbow, from which point to the extremity of the fingers this measure was taken). If we have not so many cubits (*cubitus*, elbow), it is because the cubit was an eastern measure, and we know less of the early history of Asia and Egypt than of Europe.

Only the measures exceeding the largest dimension of man have names differently derived—as *toise* (*tesa*, stretching), which shows that this was originally a thong or cord; the rod, pole, or perch (*pertica*, a rod), which shows that this was a rigid measure.

But, secondly, the metrological systems of the last century, considered in themselves, were full of confusion. There were different weights and different measures for different articles in the same town. This state of things still exists in many parts of Europe, and even in the rural districts of England. We have the remnant of it ourselves in the Avoirdupois, Troy, and Apothecaries' weight; and in our wet and dry measure—as also our ale gallon, which does not correspond to the system of wet (wine) or dry measure, but is the eighth part of an old bushel of 2256 cubic inches of the time of Henry VIII. We borrowed our capacity measures from England; but England abolished them all fifty years ago, and sub-

stituted the "imperial measure," leaving us alone with this unhappy inheritance.

But the ratios connecting the different denominations of the several systems of weight and measure are sources of greater confusion and inconvenience than even the multiplicity of the systems. The ratios of weights and measures should correspond to those of our system of abstract numeration. The simplicity of the decimal ratio is illustrated in our Federal Money. Supposing a system to be constructed not on the decimal ratio, there might be at least something better in a series of uniform ratios than exists in our extremely irregular and irrational systems. In our length measures we have, for example, five different ratios, and one of them (the relation of the yard to the rod) is fractional.

Now, in comparing the present state of the question of metrological reform with the past—say of a century ago—we find in the beginning this very remarkable point of difference between the two periods, viz., that a century ago there was no such thing as a question of metrological reform. People looked on the existing state of things as to weight and measure very much as if it were one of the dispensations of Providence. They would as soon have thought of agitating for a change of climate as for a change of their systems of metrology. Something of this feeling still survives. There yet remain people who say, "O, it is out of the question to think of breaking up systems which are interwoven with all the associations of a people. Habit is second nature, and against nature it is useless to strive."

Yet a great many things *have* been changed, in which equal difficulties must have presented themselves. There were the systems of numeration employed by the Greeks and by the Romans. These were different from each other, and both different from the Arabic, which we have now universally in use. The Moorish Universities of Cordova and Seville were the seats of the highest learning in the tenth century, and it was from them that the famous Gerbert, a man of obscure birth, but by the force of his own genius, afterwards raised to the dignity of the Popedom under the name of Silvester II., brought—surreptitiously as it may be said, since no Christians known as such were admitted to those universities—the invaluable system of Arabic arithmetical notation, which was destined to become the system not of Europe only, but of the world.

There are many other things in which the world has attained somehow to uniformity, though the history is not equally clear. Besides the Arabic numerals, mathematics has an extensive symbolic language which is the same in all lands. The musical notation of Christian nations is equally uniform.

Only temporary inconvenience could result from a change of our metrological system in such a manner as to bring it immediately into accordance with those of the greater part of the civilized world, and ultimately with all the world. Two things are necessary for this. First, to adopt the decimal system of deriving the various denominations of weight and measure from the base. Secondly, to adopt the linear base now in most extensive use. Some people—like those of Denmark, Sweden and Norway—have adopted the principle of decimalization without changing their unit bases. But others—and the larger number of the nations, European and American—have accepted in full the system founded on the metre.

Now, at the present time, not only have the majority of the peoples of Europe actually brought themselves into harmony by the acceptance of a common system of weights and measures, but among the peoples who are still behind in this work of metrological reform, there is going on so earnest and active an agitation of the subject that they too cannot fail to become soon practical reformers likewise. And this it is which gives its interest to the question in its present state. Great Britain is feeling the force of the pressure in favor of the metric system to a degree which renders the prospect of her adopting it before many years a certainty. Last summer a bill for its adoption failed in the House of Commons but by seven votes.

The lecturer here went into some statistical statements, showing that the metric system had become the system of 350,000,000 of people, including, in Europe, the inhabitants of France, Spain, Portugal, Italy, Belgium, Holland, Germany and Greece; in America, Mexico, New Granada, Ecuador, Peru, Brazil, Uruguay, the Argentine Confederation and Chili; and in Asia, British India.

He then proceeded to speak of the claims of the metre to preference on the ground that it is an aliquot part of an unalterable dimension of the globe. The metre is one ten-millionth part of a quadrant of the meridian. There is a certain satisfaction in knowing that our measures cannot by any conceivable accident be lost beyond recovery. But an accident by which all the authentic copies of any national standard should be wholly lost is utterly inconceivable. The lecturer did not therefore insist on this property of the metre as being a very weighty argument in its favor.

He spoke briefly of the several suggestions which have been made in regard to *natural* standards, viz., the velocity of light, the length of an undulation of light, the length of the pendulum; and finally, other dimensions of the earth besides the quadrant of the meridian, and particularly the earth's axis—pointing out the practical difficulties which exist in the way of making these available. The earth's axis and the quadrant of the meridian are about equally eligible, though the axis, if we were to choose anew, might be preferable on the ground of simplicity.

The true argument in favor of the metric system consists in the fact that it has been accepted by the majority of the inhabitants of the civilized world, and that the extension of it so widely, has mainly come to pass within the last twenty years. In the present state of the question, it is obvious that the United States will soon be the only important non-metric commercial nation.

The lecturer concluded his remarks by saying that the difficulties in the way of the adoption of a new system of weights and measures, so far as they consist in doing violence to old associations and habits of thought, may be obviated almost wholly by measures adopted in advance to make the new system familiar to the people. For this reason, the metric system should be thoroughly taught in all our schools. Congress should also introduce the system in the Post Office and the Custom House. By these means and others similar, the change may be made to the next generation simple and easy.

Treatment of Ores of Native Silver in Chihuahua, Mexico.

BY H. B. CORNWALL.

(Continued from page 211.)

IN the previous article we followed the progress of the ore through the stamp battery. It is taken thence to the arastras, into each of which a ton, more or less, according to the size, is charged at once. A few buckets of water are thrown in, just enough to give the mass a certain consistency, which is very essential to the proper conduct of the grinding process. If there is too little water the ore is raised up and pushed forward by the mullers, without being ground; if there is too much water it packs beneath the mullers. Water is from time to time added to preserve the proper consistency of the ore, and after the operation has been carried on about eight hours sufficient quicksilver is added to amalgamate all the silver in the ore. Generally the arastra is charged with one ton per day of the third class ore, requiring some 25 lbs. of quicksilver, and after three days run, or whenever the amalgamator thinks proper, rich ore is added, requiring proportionally more quicksilver, for the purpose of getting a suitable amount of amalgam collected in the arastra, preparatory to cleaning up. Some hours after adding the quicksilver the amalgamator takes a portion of the charge out in a horn spoon, washes it and thus judges whether there is the proper amount of quicksilver present. These assays are regularly made, but, after a little experience with any ore, he soon learns to gauge the amount of quicksilver very closely.

Every morning, after the silver appears to be thoroughly amalgamated, a large excess of water is added and the arastra kept in motion for four to six hours; the heavier particles then settle, the amalgam separates from the fine ore, and after the machine has been at rest for a short time, the water is run off, carrying with it all of the finely ground and desilverized ore. The coarser grains of ore, not yet sufficiently reduced, remain and are ground with the next charge. The tailings thus obtained are very poor, so poor that the most experienced men in the place were unwilling to pay $3 per ton for them, with the object of extracting the silver on the *patio*. They contain nearly all of the galena, zinc blende, and arsenical iron of the ore; a very little quicksilver and amalgam, and any arsenical silver (ruby silver) that may occur, with the exception of a trace that stays in the amalgam, either owing to its density or to native silver adhering to it. Most of the sulphuret of silver, being less brittle and therefore not so easily reduced to powder, settles to the bottom of the arastra and is taken out with the amalgam, in which it is plainly visible after washing. The rich tailings, removed after the rich silver ore has been added, and just before a clean up, are more valuable, and are saved for concentration or treatment on the patio. As regards the quicksilver required in this part of the process, it is found that ore containing coarse silver needs less than ore with fine silver, in proportion to the amount of silver.

When the rich tailings have been run off, the top layer of coarsely ground ore is removed with iron scrapers and reserved for the next charge. Then the amalgam is scraped up and carried in wooden bowls (*bateas*) to the washing tank. This amalgam seems, to the superficial observer, scarcely anything more than coarse sand and slime, but, on adding to a suitable amount of it, in a shallow wooden bowl, the proper quantity of quicksilver and washing it, stirring and rubbing it constantly with the hand, the clean amalgam is obtained. The dirt thus removed from it is rich and is reserved for concentration by washing on the plano table. About 10 per cent. of the quantity of quicksilver already employed in the arastra is added to the amalgam in this process of cleaning. A small portion of amalgam from the finer grained silver ores is sometimes very carefully washed, the black silver (sulphuret) being removed by grinding the amalgam on a stone and washing it thoroughly, and the resulting very pure amalgam, after straining, is retorted carefully, and furnishes the bullion used in paying expenses. It is even purer than the refined silver cast into bars.

The clean amalgam is now strained in canvass cloths, and this is the most tedious part of the process. As the amalgam is at present retorted a very firm amalgam is required, so that it is not found sufficient to strain the amalgam in large bags by merely twisting them with a stick, but the quicksilver must be thoroughly pressed out from small balls, not over 2 to 2½ inches in diameter, by squeezing and rubbing them in the canvass with the hands The coarseness of the silver, which is frequently present in *nails*, renders the separation of the quicksilver impracticable by any other means yet tried; from the very fine grained amalgam obtained on the patio the quicksilver is much more easily expressed. Probably if some other system of retorting were introduced this part of the process might be made less laborious. The strained amalgam is charged into quicksilver flasks, from which the bottom has been removed. About 65-70 lbs. of amalgam are introduced, and then the flasks are set aside to allow as much of the quicksilver to drain off as possible, and also to harden the amalgam. In a day

or so, or as soon as four of these flasks are ready, they are removed to the retorting furnace, where they are set on end over holes in a slab which forms the bottom of the furnace. There is nothing to prevent the amalgam from falling out of the flasks except four narrow strips of iron set into the mouth of the flask; the amalgam never runs out when the fire is properly managed. Other quicksilver flasks, open at each end, are placed below the holes in the bottom of the furnace, their lower ends being beneath the surface of water in a tank which lies under the furnace. After luting the lower ends of the amalgam flasks with clay and ashes there is thus no outlet for the quicksilver except into the water, where it condenses. A charcoal fire is slowly kindled around the flasks and they are thus retorted. This simple furnace, universal in that part of Mexico, has supplanted the old copper bell apparatus, but is itself susceptible of great improvement.

We have now followed the silver as far as the refining process. It is evident that whatever loss of quicksilver may have resulted is purely mechanical. There is no chemical action in the arastra, nor is any needed. Consequently the loss of quicksilver is small. A careful account is kept of it, and the result shows only ¾ ounce lost per marc (8 lbs.) of silver produced.

The retort silver is refined in a small reverberatory furnace, built of adobes and fed with wood, which can receive a charge of 600 lbs. of crude bullion. This charge is worked off in four hours; a little litharge and lead are added to remove the impurities, sulphur, arsenic, lead, iron, and, possibly, a very little zinc which is present as zinc blende, and carbonate of soda and borax are also used as fluxes. The loss is 7 per cent. on the crude bullion, and consists, to some extent, of silver and quicksilver; the amount has not been exactly ascertained, but is, doubtless, very small, as the silver is ladled out very rapidly when refined. It is cast into bars weighing about 70 lbs. each, which assay 988-1000 of silver on the average.

The slags from the refining surface, with the concentrated tailings or slimes from the tanks for washing amalgam, and, sometimes, other secondary products, are occasionally smelted in a small shaft furnace, with addition of galena, and the resulting lead is used in refining the retort silver.

An experienced amalgamator, who was working up some of the ordinary tailings from the every day run of the arastras; furnished the writer with the following facts relative to their treatment on the patio. The Mexicans sometimes make the operation pay, especially when the ores contain other ores than native silver, because they employ their *peons*, whose labor costs very little.

The tailings were made into a heap *(torta)* containing 100 *cargas* (about 16 tons), and to this were added 720 lbs. of salt, which was thoroughly mixed in, with water enough to keep the whole at a proper consistency. The next day 50 lbs. of *magistral* (in this case sulphate of copper) were added and thoroughly incorporated. The third day 100 lbs. of quicksilver were added and the whole left standing one day. Then every other day the mass was thoroughly mixed by driving mules about in it, in the usual way, and this operation, called the *repaso*, repeated until, by assays in the horn spoon, it was shown that the heap had been properly amalgamated, or was *rendida*. This requires more or less time, according to the temperature, the size of the heap, the nature of the ore, etc., and the whole operation requires great experience and care. When it was found that the heap was ready for washing, 25 lbs. of quicksilver were added, with plenty of water, and the whole thoroughly mixed. In this operation of the patio there is a chemical action; the loss of quicksilver is necessarily large, and in this particular case amounted to 25 per cent. of the original amount charged. The resulting silver from the retort showed 990-1000 fine. The amount obtained from the heap of 16 tons of tailings was only $145, leaving a loss of $5 on the expenses, not counting the amalgamator's time, and showing conclusively that simple amalgamation of native silver ores, in the arastra, is as effective and cheap a treatment as it is possible to employ, in the absence of an important proportion of combined ores, as sulphuret, chloride or arsenical ores, and in a country so difficult of access as the interior and mountainous portion of Mexico.

Sulphuret and Mineral Silver Veins.

Veins of silver glance, the richest known mineral salt of that metal, containing 87·04 per cent. of silver, are occasionally found in a pure stratum, and more frequently, mechanically mixed with decomposed gangue rock and oxides of other metals. Such veins are denominated "sulphuret lodes," in distinction to argentiferous galena and chloride lodes. Galena is known among the miners by the expressive term "mineral," and I shall use this term in what follows as both convenient and applicable.

When two veins occur in close proximity to each other, one filled with firm crevice rock and hard solid mineral, and the other, loose and broken up from wall to wall, and the ore a tolerably pure sulphuret; or when a set of parallel veins like the former are covered by a strong vein of silver glance the difficulties in accounting for such a complex formation are very great, and some of the phenomena are almost inexplicable. So far as can be shown by practical workings, all the veins in our district have chemically a similar composition. Not quantitatively however, for the percentages and combinations of the metals may differ in each; copper may occur in one as a sulphide, and in another as a chloride. The same can be said of iron which often shows in large pockets of ochre or distinct seams of pyrites. A qualitative analysis, however, of the metallic bases of ores in any one silver band will show an almost complete parallelism.

In Clear Creek County, Colorado, galena is the great carrier being fully 50 per cent. of nine-tenths of the veins, and a prominent factor in all. Iron is universal, from quantities sufficient only to color the rock to seams one and two inches in width. Zinc and copper minerals are always present, while arsensic and antimony are the accidents, and the only ones.

If it be true that the difference in the composition of crevice fillings is only near the surface, it is probable that the change took place after the formation of the vein, and was the result principally of the decomposing action of air and water. At the time when the fissures were first opened, and their contents injected or deposited by sublimation, the bed rock of the mountain was not covered as now by slide and detritus from the disintegration of the rocks. Water and the atmosphere had every chance to act upon the easily changed sulphides, and there can hardly be any donbt thas it did so. Beyond this, the character of the rock which forms the walls, whether it be of a soft or hard nature, or more or less porous; or the position of the vein in regard to sags or water courses in the bed rock, would subject some lodes to more extraneous influences than others, and would account for many of the peculiarities that exist in lodes close by each other, or in distant parts of the same lode. The Snowdrift mine is a prominent example of a sulphuret vein showing every sign of having suffered decomposition in its filling. Its south wall is distinct, but the north, very difficult to define. Between the two the ore lies in seams, some of almost pure glance others of galena and glance, and in still others the sulphuret is mixed with oxides of iron and lead, and decomposed rock, so that the color of the seam varies all the way from a light-yellow (excess of iron) to a dark brown (excess of sulphuret). The lower down the mine is sunk, the firmer becomes the wall rock, and the more mineral is apparent in the ore. In some places in the lower levels solid galena is found, but even at that depth (150 feet about) the sulphuret of silver is predominant.

But in order to form an intelligent opinion of the changes which such a vein must have undergone since its formation, it must be decided whether the silver originally existed as native metal or sulphuret. This is not so easily determined, and though according to the received formulas of argentiferous minerals, silver is rarely considered as native, it must be borne in mind that formulae are necessarily empirical merely. It is difficult to believe that a metal so easily and rapidly attacked by sulphur should remain pure; yet it does, and apparently under the most adverse circumstances—namely—when embedded and surrounded by galena, blende, and iron pyrites so saturated with sulphur that its fumes are very distinct under the blows of the pick and drill. In the Maine lode there occurs occasionally in the solid mineral bunches of rich silver large enough to cover the palm of the hand. If the metal can remain pure under such conditions it is at least possible for it to be so when distributed in a large mass of mineral.

Granting, however, that it is as a sulphuret that silver exists in galena or blende, let us examine the conditions which would ultimately convert a fissure filled with solid mineral into one composed largely of silver glance. Loose wall and crevice rock is a necessity, permitting moisture to traverse the crevice, and air to be admitted to a certain depth. Galena, blende, and iron pyrites, will, under these favorable circumstances rapidly change into the oxides and sulphides of their bases, and be largely washed away into seams in the rock, staining it as all wall and crevice rock is stained. There will be no lack of water for this purpose, for in the spring of the year and late into the summer it filtrates in considerable quantities through the tightest of crevices, hardly ever failing, to supply the miner with drill water, and generally requiring to be hoisted or pumped out of his way frequently during the day. Silver not being so easily oxidizable will, if native, have abundant chance to unite with sulphur, or if already a sulphuret will remain so. This process would be so complete on the surface that the glance would be washed or scattered in pieces among the slide rock. Farther down it would collect in the seams once filled with mineral and become mixed, more or less, with metallic salts and decomposed gangue rock. In all probability a point would at last be reached, where surfaces influences had no longer any chance to act, and a mineral vein be found. Specimens can be obtained from the Snowdrift, showing the different stages of this operation very distinctly. I have before me a small piece of ore from a seam about an inch in width. The surface is porous and mostly a sulphuret of silver. The core is galena showing a weak crystallization, and a dull lustre as if rapidly oxidizing.

In close crevices, shut in by solid walls of the hardest rock, air can have but little effect, while water, though it may act strongly, cannot rob the fissure so easily of its mineral, there being no seams to carry it off. Consequently few lodes show pay rock directly on the surface, unless they are protected by deep slides, or are in a favorable position for shedding water. For some feet there will be a filling of oxide of iron and sulphates, with little pockets of reddish mud, often paying well in silver, and seams of mineral in the tighter fissures. But these come ultimately into a solid vein, which there is every reason to suppose was the primal filling of the lode.

V. W., Georgetown, Colorado.

Messrs. JAY COOKE & Co., 20 Wall street, New York, offer to holders of 5-20's which are being called in for redemption, and also to investors, the FIRST MORTGAGE 7-30 GOLD BONDS OF THE NORTHERN PACIFIC RAILROAD, which furnish an investment security combining the ready negotiability, the convenience and the high credit of a first-class railroad bond with the solidity and safety of a real estate mortgage on land worth at least twice the amount loaned.

They are offered at par in currency, and yield a handsome profit to those exchanging 5-20's.

THE COAL TRADE.

NEW YORK, April 19, 1872.

Anthracite Coals.

WHOLESALE.—The demand for coal continues good, and there can be little if any accumulation of supplies at present. The scarcity of vessels seems to put a practical limit on the sales of coal, which it is supposed might be made larger just now if transportation could be had.

As will be seen by the advertisement of the Scranton Company in another column, a hundred and thirty thousand tons of coal are offered for sale at auction next Wednesday. The prevailing opinion among the trade seems to be that the prices will not vary materially from those obtained at the last sale. So many different causes influence the price obtained at the Scranton sales that it is almost impossible to give any reliable prognostication, and we therefore merely give what appears to us to be the prevailing opinion of the trade regarding it.

The following circulars have been issued by the Philadelphia and Reading Railroad.

CIRCULAR No. 34.

PHILADELPHIA, April 2, 1872.

If any contracts are made for Lump, Steamboat, or Broken coal, at a fixed price to be named in the contract, to be shipped by canal, before November 1st, to any point named on the coal toll sheets of the company dated March 20, 1872, or to any point on the Delaware or its tributaries south of Trenton, and if such contracts are filed in the office of the company, in accordance with the regulations relative to contract drawbacks, on or before the first of May next, the company will agree that the rates of tolls upon such coal shall not bear a higher proportion to the price at which it is sold at Schuylkill Haven than the net rates to the point of delivery of the coal, announced to take effect on March 20th, bear to the sum of two dollars and a half per ton at Schuylkill Haven: *Provided*, That the said contract rates shall not be less than the said net rates, announced to take effect on March 20th, unless the general current rates on the canal shall at any time be less, in which event, for the time being, the consignee or shipper shall have the benefit of such current rates.

CIRCULAR No. 25.

PHILADELPHIA, April 2, 1872.

If any contracts are made for Lump, Steamboat, Broken, or Chesnut coal, at a fixed price to be named in the contract, and the coal so sold is shipped from Schuylkill Haven, via the Schuylkill canal, before November 1st, consigned to New York city, or points between New Haven, on Long Island Sound, and Hudson, on the Hudson River, and if such contracts are filed in writing, in the office of this company, in accordance with the rules relative to drawbacks on contracts, on or before the first of May next, such a drawback will be paid as will reduce the charges for tolls and transportation upon such coal to twenty-three-forty-eighths of the price at which the coal is sold at the wharf, at its destination, exclusive of the charge for towing from New York city; provided that the minimum rates of freight and tolls shall not be less than $2 30 per ton from Schuylkill Haven. If the coal is sold to be delivered at places other than New York, between New Haven and Poughkeepsie, the towage will be deducted from the price at which the coal is sold before the division is made.

Anthracite Coal Trade for 1871 and 1872.

The following table exhibits the quantity of Anthracite Coal passing over the following routes of transportation for the week ending April 13, 1872, compared with the week ending April 15, 1871.

COMPANIES.	1871. WEEK.	1871. TOTAL.	1872. WEEK.	1872. TOTAL.
*Phila & Reading R.R†	37,485	810,029	123 24	1,278 011
Schuylkill Canal	4 974	48,548	27,162	65,171
Lehigh Valley R. R.	12,958	419 029	65,186	1,023,177
Lehigh & Sus. R. R.....	13.609	103,344	20,753	396.577
Lehigh Canal	103	882	3 .49	8,549
Scranton North.....	....	3.521	9 446	171,6.7
" South	....	137	46,122	576,864
Penn. Coal Co., rail....	31	3,565	29,345	281,264
" " " canal..	....	.....	....	.....
Del. & Hud. Canal Co..	2,509	2,510	10,666	10,666
" East	....	51.511	14,724	176,340
" " West	....	12,740	1,163	104,283
" " South	....	.....	7,642	96.542
Shamokin.....	19,362	145,020	10,576	119,475
Trevorton.....	....	.....	....	....
Lykens Valley Coal Co..	2,065	16,699	..	2,580
Wyoming South.....	....	.....	....	....
Wyoming North.....	....	.....	....	....
P. N. Y. C. & R. R. Co.	260	35,202	11,485	188,256
Williamstown Co'y....	....	17.847	....	....
Big Lick Col...	3,139	25,976	....	10,591
Total.....	96,337	1,496,630	381,843	4,510,003
1870.....	....	....	96,337	1,696,630
Decrease.				
Increase.....			285,506	2,813,373

* These figures are for the week and fiscal period commencing Nov. 30.

† Less coal transported for Co's use and Bituminous coal.

Bituminous Coal Trade, 1871 and 1872.

The following table exhibits the quantity of Bituminous Coal passing over the following routes of Transportation for the week ending April 13, 1872, compared with week ending April 15, 1871.

COMPANIES.	1871. Week.	1871. Year.	1872. Week.	1872. Year.
C. & O. Canal.....	19,943	88,218	19,267	64 091
B. & O. R. R.....	30 576	282,274	26,827	297,670
H. & B. T. R. R.....	9,060	91,198	4,450	87,940
*Harrisburg & D.....	14,598	146,543	9,576	176,936
*L. V. R. R....	....	12,743	502	10,791
P. & N.Y.C. & R. Co.....	5,688	81,635	7,904	110,879
Cumberl'd Branch Canal	5,718	27,689	6,440	20,318
" Railroad....	1,145	21,084	451	1.226
Total.....	86,728	751,382	75,417	769,851
	75,417			751 382
Decrease.....	11,311			
Increase				18,469

Philadelphia & Reading Railroad and Branches.

COAL TONNAGE

For the Week ending Saturday, April 13, 1872.

BY RAILROAD.—ANTHRACITE.

PASSING OVER MAIN LINE AND LEB. VAL. BRANCH.

	Tons. Cwt.
From St. Clair.	38 09 05
" Port Carbon.	5,163 02
" Pottsville.	2,677 06
" Schuylkill Haven.	21.771 00
" Pine Grove.	4,960 09
" Tamaqua.	10,335 01
" Harrisburg.	14 00
" Dauphin.	5,262 00
Total	88,572 03

FOR SHIPMENT BY CANAL.

Passing Frackville Scales	8,372 13
" Mill Creek "	4,110 04
" Schuylkill Valley Scales	2,748 10
" Mt. Carbon "	780 19
" Cressona "	11,548 04
" Pine Grove "	.....
" Tamaqua "	2,679 13
Total	29,740 03

SHIPPED WESTWARD VIA NORTHERN CENTRAL RAILROAD.

Passing Locust Gap.	1,089 17
" Shamokin.	4,580 17
" Herndon.	.....
Total	5,670 14

SHIPPED WEST OR SOUTH FROM PINE GROVE.

Via Schuylkill & Susquehanna R. R.	1,370 10
" Lebanon & Pine Grove Branch	701 12
Total	2,072 02

CONSUMED ON LATERALS.

From Frackville Scales.	730 19
" Mill Creek "	734 13
" Schuylkill Valley Scales.	514 15
" Mt. Carbon "	670 17
" Cressona "	217 18
" Pine Grove "	137 16
" Tamaqua "	663 16
Total	3,670 14

LEHIGH AND WYOMING COAL.

Received via Allentown, E. Penn'a Br.	64 17
" " Alburtis, " "	.....
" " Oreland, G. & N. Br.	858 19
" " Connecting R. R.	.....
" " Willow Street R. R.	373 19
Tota	1,297 15

BITUMINOUS.

From Harrisburg.	9,565 15
" Connecting R. R., G. & N. Br.	.....
" Junction R. R.	10 00
Total	9,575 15

COAL FOR COMPANY'S USE.

Anthracite	5,904 05
Bituminous	214 18
Total.	6,119 03

RECAPITULATION

	Total for Week.	Corres-p'g week last year.	Increase and Decrease.
Passing over Main Line and Leh. Val. Branch	88,572 03	15,951 07	i 72.620 16
For Shipment by Canal	29,740 03	6,716 17	i 23,023 06
Shipped Westward via Northern Central R. R.	5,670 14	12,110 18	d 6,440 04
Shipped West or South from Pine Grove	2,072 02	1,489 19	i 582 03
Consumed on Laterals	3,670 14	1,191 05	i 2,479 09
Lehigh and Wyoming Coal	1,297 15	25 00	i 1,272 15
Total Anthracite paying freig't	131,023 11	37,485 06	i 93,538 05
Bituminous	9,575 15	14,598 00	d 5,022 05
Total of all kinds paying freig't	140,599 06	52,083 06	i 88,516 00
Coal for Company's use	6,119 03	5,290 18	i 828 06
Total Tonnage for Week	146,718 09	57,374 04	i 89,344 05
Previously this year	139697710	974,151 13	i 422,825 17
Total to date	154369519	103152517	i 512,170 02

SHIPPED BY CANAL.

From Schuylkill Haven	25,037 01	2,011 05	i 23,025 15
" Port Clinton	2,125 00	3,780 00	d 1,655 00
Total Tonnage per Week	27,162 00	5,791 05	i 21,370 15
Previously this year	38,009 09	45,510 17	d 7,501 08
Total to date	65,171 09	51,302 02	i 13,869 07

Schuylkill Canal.

Report of coal transported over the Schuylkill Canal for the week ending Saturday, April 13, 1872.

	Tons. Cwt.
From Schuylkill Haven	25,037 00
" Port Clinton	2,125 00
Total for week	27,162 00
Previously this year	38,009 09
Total	65,171 09
To same time last year	48,543 00

Lehigh Coal and Navigation Company.

Report of Coal transported over the Lehigh Canal and L. & S., Div. of Central Railroad of New Jersey for the week ending April 13, 1872, and for the year 1872.

	WEEK.	YEAR.
Forwarded East of Mauch Chunk by Rail	20 753	396,576
Delivered at and above do.,	 1,196	18,469
Forwarded East of do., by Canal..	8,549	8,549
	30,499	423,587
Corresponding period last year—		
Forwarded East of Mauch Chunk by Rail.....	13,669	103,344
Delivered at and above do.,	 1,957	14,553
Forwarded East of do., by Canal..	163	881
	15,729	118,779
Increase on Railroad	6,383	297,140
Decrease " "		
Increase on Canal	8,383	7,667
Decrease " "		
Of the above there was transported on account of—		
Lehigh Coal Nav. Co	12,921	121,463
Wilkesbarre Coal & Iron Co	7,231	213,971
	20,153	335,434
Corresponding period last year—		
Lehigh Coal Nav. Co	652	20,986
Wilkesbarre Coal & Iron Co	13,700	74,183
	14.352	95,170
Increase	5,809	240,264
Decrease		

Delaware and Hudson Canal Company.

Coal mined and forwarded by the Delaware and Hudson Canal Company for the week ending Saturday, April 13, 1872.

	WEEK.	SEASON.
North	45,385 11	683.623 14
South	7,642 10	96,542 19
Total 1872	53,028 01	780,166 13
Corresponding time in 1871:		
North	Suspension.	
South	"	
Total		
Increase North		
Decrease North		
Increase South		
Decrease South		
Total decrease 1872		
Total increase 1872	53,028 01	780,166 19

Delaware Lackawanna & Western Rail Road Company.

Coal transported on the Delaware, Lackawanna and Western R. R., for week ending April 13, 1872:

	Week. Tons. Cwt.	Year. Tons. Cwt.
Shipped North	9,446 09	171,656 18
Shipped South	46,122 07	576,864 05
Total	55,568 16	748,521 03
For the corresponding time last year:		
Shipped North		
Shipped South		
Total	7,759 03	13 019 05
Increase	47,809 13	735,501 18
Decrease	.....	.....

Report of Coal Transported over Lehigh Valley Railroad

Report of coal tonnage for the week ending April 13, 1872, with totals to date, compared with same time last year.

WHERE SHIPPED FROM.	WEEK. Tons. Cwt.	TOTAL Tons. Cwt.
Total Wyoming	8,688 14	177,632 10
" Hazleton	40,901 10	673,604 03
" Upper Lehigh	11 07	1,074 04
" Beaver Meadow	17,905 12	244,637 12
" Mahanoy	10,865 16	88,143 13
" Mauch Chunk		1,303 17
Total	78,372 19	1,186,393 19
Same time last year	14,057 06	475,717 05
Increase	64,315 13	710,676 14
Decrease		
Forwarded East from Mauch Chunk by rail	65,186 09	1,023,178 12
Same time last year	12,957 12	419,029 04
Increase	52,228 17	604,147 04
Decrease		

DISTRIBUTED AS FOLLOWS.

Forwarded East from Mauch Chunk by rail	64,317 02	1,003,821 19
do East for use L. V. R. R.	869 07	19,354 13
Delivered at and above Mauch Chunk for use of L. V. R. R.	1,134 04	21,660 19
To P. & N. Y. R. R.	7,185 16	107,638 12
To N. C. R. R., at Mount Carmel		73 06
To D. H & W. R. R.	851 09	8,712 10
To L. & S. R. R. at Packerton for rail	265 06	5,749 18
Delivered at M'h Chunk	21 13	792 05
Delivered on line of road above Mauch Chunk	191 12	8,306 14
To L. & S. R. R., at Penn Hav., for railroad		3,950 07
Do. for canal	1,242 00	2,106 07
To Lehigh Canal Mauch Chunk	1,946 00	2,045 07
To Catawissa Railroad	348 10	2,192 02
Total	78,372 19	1,186,363 19

Huntington and Broad Top R. R. Co.

For week ending April 13, 1872	4,450 tons.
Same time last year	9,060 "
Increase	
Decrease	4,610 "
Total amount shipped to date	87,940 "
Same time last year	91,198 "
Increase	
Decrease	3,258 "

Shamokin Coal Trade.

For week ending April 13, 1872	10,675 10
Same time last year	19,062 06
Increase	
Decrease	8,386 16
Total amount shipped to date	119,475 08
Same time last year	145,019 14
Increase	
Decrease	25,544 06

Report of Coal Transported over Central R.R. of N. J. (Lehigh and Susq. Div.)

Week ending April 13—Compared with same time last year.

WHERE SHIPPED FROM	WEEK 1872., tons ct	WEEK 1871. tons ct.	YEAR 1872 tons cwt.	YEAR 1871, tons cwt.
Wyoming Region	11583 15	15357 10	292770 11	94206 10
Upper Lehigh Region	4537 19		54165 08	4614 06
Beaver Meadow Region				
Hazleton Region	1487 08		5903 14	1121 17
Mahanoy Region				
Tresckow Region	4229 03		20965 17	1043 03
Mauch Chunk Region	8191 06	557 08	107709 06	19655 12
Totals	30029 11	15914 18	480614 16	120640 08
Increase	14114 13		359974 08	
Decrease				
DISTRIBUTION.				
Forwarded East of Mch Chunk by Rail	20753 04	13609 10	396576 17	103344 04
Forwarded East of Mch Chunk by Canal	4751 14	203 02	4849 06	203 02
Delivered at and above Mauch Chunk	1136 16	1957 01	18460 19	14553 03
L. V. R. R at Packer'n	87 19	145 05	4426 16	2539 19
Delivered to L. & B. R. R.at Plymouth Bridge	3237 18		56293 18	
Totals				
Of the above there was transported on acc'nt of L. C. & N. Co	8400 72	557 03	116941 16	30891 19
W.-B. C. & I. Co	7241 15	13709 06	213971 15	74483 07
Totals	15631 17	14257 14	330913 11	95975 06
Increase	1374 03		25.838 05	
Decrease				

Penn. and N. Y. R. R.—Coxton, Pa.

Coal tonnage for week ending April 13, 1872.

	Week. Tons.	Cwt.	Total. Tons.	Cwt.
Anthracite received :				
From Lehigh Valley R. R.	7185	16	107,638	12
" Lack. & B. R.R.	1591	11	26,644	10
" Pleasant Valley R. R.	2154	19	34,633	19
" Sul. & Erie R. R.	255	03	19,338	13
Total	11485	09	188,255	14
Distributed ;				
To Lehigh Valley R. R.			18,499	18
To Lack. & B. R. R.	145	00	1 017	17
To S. Central R. R	2176	09	53 573	03
To Ithaca & A. R. R.	1713	12	43.940	03
To Erie R. W. Pockets for shipm't.	6412	19	53,938	19
To individuals on line of road	276	13	11,250	09
To points at & above Carbon for use of Co	384	19	9,342	01
To points between Waverley and Elmira	375	17	16,693	04
Total	11,485	09	188,255	14
Bituminous :				
Received from Barclay R. R.				
Shipped North from Towanda	7894	00	109,922	08
Shipped South from Towanda	10	00	865	12
Northern Central R. R.			91	01
Total	7 04	00	110,879	01
Distributed :				
To Erie R. R.	6579	03	96,971	01
To So. Central R. R.	1314	17	12,799	12
To Ithaca & A. R. R.			21	15
To Lehigh Valley R. R.	10	00	735	02
To individuals on line of R R			263	11
To points on line of road for use of Company			88	00
Total	7904	00	110,879	01

Statement of Coal Transported over Cumberland and Pennsylvania Railroad

During the week ending Saturday April 13, and during the year 1872, compared with the corresponding period of 1871.

WEEK.

	To C.& O. Canal Tons.	Cwt.	To B.&O. R.R. C. Tons.	Cwt	Total. Tons	Cwt.
1872	19,267	07	26,827	06	46,094	13
1871	19,942	18	30,576	13	50,519	11
Increase						
Decrease	675	11	3,749	07	4,424	18

YEAR.

1872	64,090	11	297,670	04	361,760	12
1871	88,218	07	282,272	05	370,490	15
Increase			15,397	19		
Decrease	24,127	16			8,729	17

Cumberland Branch R. R.

WEEK.

	To C. & O. Canal. Tons.	Cwt.	To B.&O.R.R. Co Tons	Cwt.	Total. Tons.	Cwt.
1872	6,440	00	450	13	6,890	13
1871	5,717	12	1,144	15	6,862	07
Increase	722	08			28	06
Decrease			694	02		

YEAR.

1872	20,318	06	1,226	10	21,544	16
1871	27,688	12	21,084	10	48,773	02
Increase						
Decrease	7,370	06	19,858	00	27,228	06

Pennsylvania Coal Company.

Shipments of Pittston Coal for the week ending April 13, 1872.

	1872. WEEK.	YEAR.	1871. WEEK.	YEAR.
By Railway	25,344 15	281,263 12	31 04	3,566 08
" Canal				
Total	25,344 15	281,263 12	31 04	3,566 08
Increase 1872	277,697 04			

Delaware and Hudson Canal Company.

The following is a statement of Coal Transported by the Delaware and Hudson Canal Co. for the week ending April 13 1872.

	FOR THE WEEK.	FOR THE SEASON.
By Delaware and Hudson Canal,	10,666	10,666
By Railroad, East	14,724	176,340
" " West	1,163	104,283
" " South	7,642	96,542
Total Tons	34,195	387,831

For the same period last year.

	FOR THE WEEK	FOR THE SEASON.
By Delaware and Hudson Canal,	2,500	2,500
By Railroad, East,		51,511
" " West		12,720
" " South		
Total Tons	2,500	66,731
Increase	321,100	

Lehigh Canal Coal Trade.

Shipped for the week ending April 12th, 1872.

	Week. Tons.	Cwt.	Week. Tons.	Cwt
Total from Mauch Chunk Region	4 521	06	4,521	06
" " Beaver Meadow "	1,848	15	1,848	15
" " Tresckow "	375	16	375	16
" " Mahanoy "	97	05	197	05
" " Hazleton "	1,242	00	1,242	00
" " Upper Lehigh "	277	04	277	04
" " Wyoming "	187	00	187	00
Total	8 549	06	8,549	06
Corresponding week last year	163	04	881	18
Increase	8,386	02	7 667	08
Decrease				

Prices of Coal by the Cargo.

(CORRECTED WEEKLY.)

	AT NEW YORK, April 13. R. A.	W. A.	AT PHILADELPHIA, April 19. R. A.	W. A.
SCHUYLKILL.				
Lump	$- —	$- —	- —	- —
Steamer	- —	- —	- —	
Broken	- —	- —	- —	
Egg	5 25	4 75	- —	- —
Stove	5 50	5 00	- —	- —
Chestnut	4 25	—	- —	
Pea	- —	- —	- —	- —
LEHIGH.				
Lump, (along side)	5 00	—	- —	- —
Broken	4 75	- —	- —	- —
Egg	4 50	- —	- —	- —
Stove	5 25	- —	- —	- —
Chestnut	4 25	- —	- —	- —
Pea	- —	- —	- —	- —
SPECIAL COALS.*				
Honey Brook, Le'h W. A.	4 00@4 75		- —	- —
Spring Mountain " "	- —@—		- —	- —
Sugar Creek " "	- —@—		- —	- —
Sugar Loaf " "	- —@—		- —	- —
Old Comp'y's " "	4 00@4 75		- —	- —
Room Run " "	4 00@4 75		- —	- —
McNeal " "	- -		- —	- —
Girardville " "	- —		- —	- —
Hill & Harris " "	- —		3 10@4 00	-
Shamokin " "	- —		- —	- —
Lykens Valley " "	- —		- —	- —
Broad Top " "	- —		- —	- —
McMichael " "	- —		3 25@4 25	- —
Henry Clay " "	- —		- —	- —
Powelton "	- —		- —	- —

Dealers in these coals may be found in our advertising columns.

Company Coals.

April, 1872.

	L.	Str.	Gra	Eg.	Sto	Chest
*Scranton at E. Port	3 47	3 53	3 60	3 63	4 19	3 58
*Pittston at Newburg	3 80	3 89	3 95	4 05	4 30	3 80
*Lackawana at Weehawken	3 75	3 75	3 85	3 85	4 25	3 75
Wilk'b're at Hoboken	3 75	3 75	3 85	3 85	4 25	3 80
Old Co. Lehigh at PtJohn'n	5 25	—	4 40	4 40	4 60	4 10
Lehigh at Eliz. Port	5 00	—	4 25	4 25	4 50	4 00

For freights to different points see "Freights."

* To contractors only.

Bituminous Coals (Cumberland).

Georgetown, F.o.b.	$4.25
Baltimore "	4.70
New York "	6.75

Prices of Gas Coals.

April, 1872.

PROVINCIAL.

Corrected weekly by Louis J. Belloni, Jr., 41-43 Pine st., N. Y. Duty, $1 25, gold

	Coarse	Slack.
Block House	$1 60	@-1 75
Gowrie	1 60	@-1 75

Corrected by Bird, Perkins & Job, 86 South street.

	Coarse.	Culm of Coal.
Pictou	$2 25	@1 25
Sydney	25	@- 80
Lingan	1 60	@- 80
Little Glace Bay	1 60	@1 00
Caledonia	1 60	@- 80

A discount from the prices of the coarse Coal on purchase of 5000 tons and upwards. Duty $1 25 per ton, gold, on the coarse coal. 25 per cent. ad valorem on the Culm of Coal

AMERICAN.

	Currency.
Westmoreland	$7 00 @- —
Fairmount Gas Coal Co. of N. Y.	7 00 @- —
Despard Coal Co	7 00 @- —
Penn	7 00 @- —
Newburg Orrel Gas	- — @- —
West Fairmount Gas Coal	7 00 @- —

AT PHILADELPHIA.

Powelton	$6 75

TO NEW YORK.

Provincial.	
Sidney	$3 25
Lingan	3 25
Cow Bay	3 12½
Port Caledonia	3 37½
Little Glace Bay	3 25

Prices of Foreign Coals.

April, 1872.

Duty $1 25 per ton.

Corrected weekly by PARMELE BROS., No 32 Pine street, N. Y.

Liverpool Gas Caking	$ 8 00@— —
" " Cannel	12 00@13 00
" House "	18 00@20 00
" Orrel	14 00@16 00

Per ton 2,240 lbs., ex-ship.

PRICES FROM YARD.

Liverpool House Orrel, screened	$16 00@17 50
"Cannel, "	20 00@25 00

Per ton 2,000 lbs. delivered.

Freights.—April, 1872.

TO EASTERN PORTS.	Cumberland. From Georgetown.	Cumberland. From Baltimore.	Anthracite. From Philadelphia.	Anthracite. From Elizabethport, Port Johnston, and Hoboken.	Anthracite. From Newburg.	Anthracite. From Rondout.
Amesbury						
Bangor						
Bath						
Boston	3 25	3 75	3 75	2 55		2 90
Bridgeport	2 75	2 75		1 00		1 25
Bristol				1 70		1 85
Derby	3 58			1 25		
Dighton	3 00	2 75				
East Cambridge						1 85
Fall River	3 00	3 00		1 65		
Hackensack						
Hartford	3 50					1 75
Hoboken	2 10					
Jersey City	2 10	2 00		50		
Middletown						1 50
Mystic				1 20		
New Bedford	3 00	3 00		1 65		1 85
Newburyport		3 50		2 75		3 10
New Haven	2 75	2 75		1 00		
New London	3 00	2 75		1 30		1 25
Newport				1 65		1 80
New York	2 15	2 15		50		65
Norwalk				1 00		1 25
Norwich				1 40		1 60
Pawtucket						1 95
Portland			3 75	2 45		3 10
Portsmouth, N.H			3 90	2 65		
Providence	3 00	3 00		1 65		1 85
Rockport						
Saco						
Sag Harbor			3 75			
Salem			3 85	2 50		2 90
Stamford						
Stonington				1 20		1 65
Taunton						
Warren						
Washington						
TO RIVER PORTS.						
Albany				55		
Catskill				50		
Cocksackie				50		
Coeyman's				65		
Cold Spring				20		
Fishkill				20		
Haverstraw				40		
Hudson				40		
New York						
Nyack				45		
Poughkeepsie				30		
Rhinebeck				30		
Rondout						
Saugerties				40		
Sing Sing				50		
Stuyvesant						
Tarrytown				50		
Troy				75		
West Point				20		
Yonkers				50		

Rates of Transportation to Tide Water.

BY RAILROAD.

TO PORT RICHMOND, PHILADELPHIA.

Philadelphia and Reading Railroad, from Schuylkill Haven for consumption	$1 85
For reshipment	1 75

MAUCH CHUNK TO ELIZABETHPORT.

L. V. Railroad from Mauch Chunk to Phillipsburgh	$0 66
C. R. R., N. J., Phillipsburgh to Elizabethport	0 98
Shipping expenses at Elizabethport	25
Wharfage	10
Total	$1 99

MAUCH CHUNK TO PORT JOHNSON.

L. V. R.R., or L. & S. R.R. from M. C. to Phillipsb'g	$0 66
C. R. R., of N. J., Phillipsburgh to Pt. Johnson	0 98
Shipping expenses	25
Wharfage	10
Total	$1 99

TO HOBOKEN.

L. V. R. R., Mauch Chunk to Phillipsburgh	66
Morris & Essex R. R. Phillipsburgh to Hoboken	0 98
Shipping expenses	25
Wharfage	10
Total	$1 99

TO SOUTH AMBOY.

L. V. R. R.	66
B. & D. R. R.	
Cam. & Am. R. R.	83
Shipping Expenses	35
Total	$1 84

PENN HAVEN TO ELIZABETHPORT.

L. V. R R. Penn Haven to Phillipsburgh	0 78
C. RR. of N. J. Phillipsburgh to Elizabethport	0 98
Shipping expenses	25
Wharfage	10
Total	$ 2 11

MARKET REVIEW.

FOR THE WEEK ENDING APRIL 18, 1872.

IRON—There has been very little inquiry for either Scotch or American Pig, but the stock of both kinds is very light, and the market closes strong at full previous quotations—we have only to notice a sale of 50 tons Glengarnock, on private terms; we quote Eglinton and Glengarnock $55, No. 1 American $50a$52, and No. 2 do. $49a$50. There continues an active inquiry for Wrought Scrap, and prices have an upward tendency—400 tons No. 1 sold to arrive at a private price. The demand for Rails has been rather moderate, but the supply is small, and prices are supported—350 tons old T and Double-Headed sold, part at $54 gold. Bar continues strong at the advance of last week on American and English Refined from store. Burden's "H. B. & S." has all been advanced $5, bringing ¾ to 2 inch Round and Square, and 1 x ⅜ to 6 x 1 Flats, to $115—Extra sizes ¼ to 11-16 inch Round and Square $145 to $120—2⅛ to 3½ $120a$125—3¾ to 4 inch $125a$130—Ovals ½ to ⅞ inch $145a$130—Half Ovals ½ to ⅞ and over, $150a$135—and Half Round same sizes $145a$130, net cash. Small lots Russia Sheet sold at 18½ cents gold, and Black Sheets at ½ a ¾ cent advance on previous quotations. We were reported yesterday a further advance of 10s. on Bar in England, and 20s. on Hoop and Sheet, but we were not able to confirm it, though it was not improbable.

PHILADELPHIA, April 15.—(From Circular of EDWARD SAMUEL.)—The market for Pig has been comparatively quiet. The Western market is apparently well supplied with "Neutral" grades of forge Iron, and the largest demand there, is for "Red Shorts." The Pittsburgh Bar price is 4·8 cents, and the Philadelphia mill price 4.6. All the mills are full of orders for some time to come, but in some sections are in trouble with their men. There is more inquiry for new rails, and several mills have booked orders at quoted prices. Old Rails are extremely scarce, the high price deters many consumers from using them. Closing prices American No. 1 Foundry Pig at furnace $49a$50, No. 2 $48a$49, No. 3 Forge $46a$47, No. 4 White and Mottled $41a$43, American Refined Bar (mill price) $103,04 or 4.6 cents, and Rails (at mill) $82a$75.

LEAD—Foreign Pig is held with increasing firmness; 75 tons Spanish sold at $5,90 gold, and we understand there has been some movement besides up to $6,12½a$6,-25, but if purchases have been made at these figures, the particulars are not made public; Bar 8¼ cents, Sheet and Pipe 10, and Tin-lined Pipe 15, less 10 per cent. to the Trade.

COPPER—New Sheathing is steady at 46 cents, and Bolts and Braziers 48, Bronze and Yellow Metal Sheathing 30, and Y. M. Bolts 32. After the feverish excitement of the past month in Ingot, the market has relapsed into a very quiet state, and the previous extreme rates are not sustained. The proposition in Congress to reduce the duty one cent per lb. causes speculators to pause, and manufacturers buy only as their immediate wants dictate. The late high prices current here have induced considerable shipments from England hither, which has rather a disturbing influence, though this description is not in favor with our manufacturers. Sales have been made of about 50,000 lb. Lake at 43a44 cents, cash; 300,000 lb., for June to September delivery, 35½; and, some days ago, 200,000 lb. English, 36½a37½.

STEEL—From store, continues firm, but unchanged in price, notwithstanding the advanced and strong market for English in the home market.

SPELTER—Telegrams have been received since our last advising an advance in the European markets of £1 per ton, bringing the price of good brands up to £24. Prices here, while no higher, are stronger, with more disposition to buy, and we notice sales of 200 tons Silesian, to arrrive, at 7¼a7¼ cents gold.

TIN—The excitement and activity in Pig, noted last week, has been succeeded by a quiet market, though prices remain quite firm; Cable despatches from Singapore advise an additional advance of $1 per picul, now $41; the only sale since our last has been 5 tons English L. & F., to arrive, at 42 cents; Straits may be quoted 42a 42½ cents, English 42, and Banca 50a52, all gold. Plates continue in demand, and prices are very firm; sales have been made of 1000 bxs. Charcoal Terne at $11,87½; 300 do., $12,25; 109 do. M. F., $13,25; 1000 do. I. C. Coke, 14 by 20, $12,25a$12,50; 1000 do. Coke Terne, $11a$11,-12½, all gold; 1000 do. Charcoal Tin, 250 do. I C. Coke, 10 by 20, and 1000 do. Coke Terne, on private terms.

ZINC—Mosselman Sheet is steady at the late advance, viz. 9½ cents less 4 per cent., gold, from Agents' hands. Am. zinc 7a7½; French 8; Metallic 10½ to 11; Manganese 4½ per lb.

METALS.

NEW YORK, April 18, 1872.

IRON.—Duty: Bars, 1 to 1¼ cents ℔ lb; Railroad, 70 cents ℔ 100 lbs.; Boiler and Plate, 1½ cents ℔ lb; Sheet, Band, Hoop, and Scroll, 1¼ to 1¾ cents ℔ lb; Pig, $7 ℔ ton; Polished Sheet, 3 cts. ℔ lb; Galvanized 2½; Scrap Cast, $6; Scrap Wrought, $8 per ton

	Store Prices.
Pig, Scotch No. 1, ℔ ton	50 00@55 00
Pig, American, No. 1	50 00@52 —
Pig, American, No. 2	49 00@50 —
Pig, American, Forge	47 00@48 —
Bar Refined, English and American	100 00@105 00
Bar Swedes, assorted size (ot)	95 00@100 00
	Store Prices, Cash.
Bar, Swedes	125 00@135 00
Bar, Refined, ¾ to 2 in. rd. & sq. 1 to 6 in. x ¾ to 1 in.	105 00@— —
Bar, Refined, 1¼ to 6 by ½ & 5:16 & 2½ to 2⅞ rnd. sq.	110 00@— —
Bar, Refined, 1 & 1½ by ¼ & 5:16	117 50@— —
Large Rounds	122 50@127 50
Scroll	122 50@152 50
Ovals and half-round	127 50@137 50
Band	— —@172 50
Horse Shoe	120 00@130 50
Rods, ⅜ to 3-16 inch	115 00@155 00
Hoop	135 00@177 50
Nailrod	8 @— —
Sheet, Russia, as to assortment (gold)	— @ 18 ½
Sheet, Singles, D. and T. Common	—6½@— 6¾
Sheet, D. and T. Charcoal	—7½@— 8¼
Sheet, Galv'd, Nos. 10 to 27	—@— —
" " Nos. 28, and 29.	—@— —
Rails, English (gold), ℔ ton	—@75 00
Rails, American, at Works in Pa.	—@85 00

COPPER.—Duty: Pig, Bar, and Ingot, 5; old Copper 4 cents ℔ lb; Manufactured, 45 per cent. ad val.

	All Cash.
Copper, New Sheathing, ℔ lb	— @— 46
Copper Bolts	— @— 48
Copper Braziers, 16oz. and over	— @— 48
Copper Nails	— @— 51
Copper, Old Sheathing, &c. mixed lots	— @— —
Copper, Old, for chemical purposes, 14@16 oz.	— @— —
Copper, American Ingot	43 @— 44
Yellow Metal, New Sheathing & Bronze	— @— 30
Yellow Metal Bolts	— @— 32
Yellow Metal Nails	30 @— 32

LEAD.—Duty: Pig, $2 ℔ 100 lbs.; old Lead, 1¼ cents ℔ lb; Pipe and Sheet, 2¼ cents ℔ lb.

Galena, ℔ 100 lbs	$—	@—	—
Spanish (gold)	5 90	@6 00	
German, do.	5 90	@6 00	
English do.	5 95	@6 80	
Bar (net)	8 50	@ —	
Pipe (net)	— —	@10 00	
Sheet	— —	@10 00	

Colwell, Shaw & Willard Tin-Lined Lead Pipe 15 cts. ℔ lb.

STEEL.—Duty: Bars and ingots, valued at 7 cents ℔ lb or under, 2¼ cents; over 7 cents and not above 11, 3 cents ℔ lb; over 11 cents, 3½ cents ℔ lb, and 10 ℔ cent ad val. (Store prices.

English Cast (2d and 1st quality) ℔ lb	— 16	@—	18
English Spring (2d and 1st quality)	— 7	@—	10
English Blister (2d and 1st quality)	— 10	@—	17
English Machinery	— 11	@—	13
English German (2d and 1st quality)	— 10½	@—	12
American Blister "Black Diamond"	— —	@—	12
American, Cast, Tool do.	— 15	@—	16
American, Spring, do.	— 9	@—	11
American Machinery do.	— 9	@—	10
American German, do.	— 9	@—	11

TIN.—Duty: Pig, Bars, and Blocks, 15 ℔ cent. ad val.; Plate and Sheets and Terne Plates, 25 ℔ cent.; Roofing 25. ad val.

	Gold ℔ lb.
Banca	50 @52
Straits	42 @42½
English	42 @—

PLATES. *Fair to Good Brands.*	*Gold.*	*Currency.*
I. C. Charcoal, ℔ box	$13 75 @14 00	$15 00 @15 50
I.C. Coke	12 50 @13 00	14 00 @14 50
Coke Terne	10 50 @11 25	11 75 @12 00
Charcoal Terne	12 50 @13 00	13 50 @14 50

SPELTER—Duty: In Pigs, Bars & Plates, $1.50 p. 100 lb

Plates, Foreign (gold) p. 100 lb.	7 12½@ 7 37½
Plates, Domestic p lb.	— 7 @— 11

ZINC—Duty: Pig or Block, $1.50 per 100 lb.; Sheet 2½c per lb

Sheet per lb.	— 10½@— 11¼

San Francisco Stock Market.

BY TELEGRAPH.

Our advices from the San Francisco Stock Market are dated the 16th inst. The market is still advancing not an item in the list, forming an exception to the constant upward movement. Belcher has advanced $215 per share during the operations of the week, the report placing it on the list as selling at $990. Imperial figures next in importance having advanced $136 since our last. Crown Point is being manipulated in the Board at $1210 per share and thereabouts. "Associate Press" advices dated the 12th inst., quote Hale & Norcross at $500; Ophir $77 and Alpha $71 per share. The report of the Board is as annexed.

	April 9.	April 16.
Savage	—	465
Yellow Jacket	—	162
Kentuck	—	415
Chollar Potosi	—	147
Gould & Curry	—	475
Belcher	—	990
Imperial	—	360
Eureka C. V.	—	—
Amador	—	300
Crown Point	—	1210

Mining Stocks.

NEW YORK, April 18, 1872.

With the exception of a slight decline in Am. Flag, Mining stocks are firmer. The transactions in the Board during the past week have been about the same as reported for the week previous. "Hilton" "Mendota" and "Quincy" "Copper" is quoted at respectively $1.75, $2.00 and $3.00 per share. The report of the board is as follows:

	BID.	ASKED.
American Flag	14	24
Bates & Baxter	30	—
Benton	2	5
Black Hawk	90	1 00
Jasco Gold	—	—
Central Gold	4	6
Cons Gregory	37	45
Grass Valley	7	10
Gunnell	20	30
Holman	—	—
La Crosse	35	38
Liberty	1	2
Mariposa prf	—	—
Rocky Mount	4	10
Quartz Hill	25	30
Smith & Parm	50	53

Petroleum.

Petroleum remains unchanged with but few sales. The following is the report of the Board.

	BID.	ASKED.
Bennehoff Run	20	30
Blood Farm	5	—
Broevoort	1 75	2 50
Buchanan Farm	40	50
Central	50	55
Home	1 35	1 50
New York & Allegheny	1 25	—
Northern Light	30	—
Phillips Pet	5	15
Pithole Creek	—	1 00
Rathbone Oil	20	—
Rynd Farm	25	30
Second National	—	40
United Petroleum Farms	28	35
United States	35	55
Bergen Coal and Oil	—	40
Bliven Oil	—	50
Clinton	—	—
National	—	—
Sherman & B	—	—
Tarr Farm	—	—
Webster	—	—

MISCELLANEOUS.

101st Auction Sale.

130,000

TONS SCRANTON COAL.

On WEDNESDAY, APRIL 24th, 1872.

NEW YORK, April 17th, 1872.

The Delaware, Lackawanna and Western Railroad Company, will sell, by MESSRS. JOHN H. DRAPER & CO., Auctioneers, at the Company's Sales Room, 26 EXCHANGE PLACE, corner of William Street, NEW YORK, on WEDNESDAY, April 24, at 12 o'clock, noon,

130,000 TONS

OF

COAL, FROM THE LACKAWANNA REGIONS,

of the usual sizes, deliverable at their Depot, Elizabethport, N. J., during the month of May, 1872.

The sale will be positive; each lot put up will be sold to the highest bidder; no bids, in any form whatever, being made for account of, or on behalf of the Company. The conditions will be fully made known at the time of sale.

TERMS: FIFTY CENTS PER TON, payable in current funds, on the day of sale, and the balance, within ten days thereafter, if required, at the office of the Company,

SAMUEL SLOAN, *President.*

Zell's Descriptive Hand-Atlas of the World.

ORIGINAL IN STYLE OF ENGRAVING, COLORING, LETTERING AND GENERAL APPEARANCE.

An Index to every Map, and a General Index to the Whole Atlas.

Beautifully Engraved, and Printed in Colors, will be completed in twenty-five numbers, at fifty cents each, during the year 1872.

This will be the most Artistic, the Best, the most Reliable, and the most Recent.

No other Atlas in the country can approach it in beauty, finish and reliability. A sample number will be sent to any address upon receipt of twenty-five cents.

Zell's Popular Encyclopedia,

The best, latest and cheapest ever published; is the only COMPLETE ENCYCLOPEDIA written since the war, hence the only one giving any account of the late battles, and those who fought them.

Total cost, bound, to subscribers only, $32, a saving of over more than $100 over similar works.

A fifty cent specimen number, containing forty pages will be sent free for 10 cents. Agents and Canvassers wanted. Sold only by subscription. Address

April 23:3mos T. ELWOOD ZELL, Proprietor.

COOPER'S GLUE AND REFINED GELATINE

COOPER HEWITT, & CO.,

NO. 17 BURLING SLIP, NEW YORK.

Bar Iron, Braziers' Rods, Wire Rods, Rivet and Machinery Iron, Iron and Steel Wire of all Kinds, Copperas &c., &c.

RAILROAD IRON, COOPER WROUGHT IRON BEAMS AND GIRDERS,

Martin Cast-Steel, Gun-Barrel and Component Iron,

PUDDLED AND REFINED CHARCOAL BLOOMS,

Ringwood Anthracite and Charcoal Pig Iron.

Works at Trenton and Ringwood, N. J.

May 17:1y

New Publications.

A PRACTICAL TREATISE ON THE CONSTRUCTION OF HORIZONTAL AND VERTICAL WATER-WHEELS. *With Twelve Plates. Specially Designed for the Use of Operative Mechanics. By* WILLIAM CULLEN, *Millwright and Engineer.* E. & F. SPON, London and 446 Broome St. New York, 1871. Price $5.

THIS treatise is calculated to be useful, rather as a record of experience and an authoritative guide to mechanics, than as a demonstration of the theories involved, or any contribution to them. Indeed, almost the only attempt which Mr. CULLEN makes to propound anything like a theory (p. 22) is highly vague and unsatisfactory. But the dimensions which he gives for various kinds of water-wheels, and the handsome plates, which are so large, clear and exactly drawn as to be available for working plans, will prove practically useful.

The book is chiefly devoted to the horizontal water-wheel, or turbine, and particularly to that of FOURNEYRON, which Mr. CULLEN minutely describes and strongly recommends, apparently preferring it to every other pattern. We may be misled by national vanity; but we think American practice is better than French or English or Irish in this line; nevertheless, the experience gained abroad may be profitably studied by our constructors. The range of Mr. CULLEN's book may be inferred from t.e fact that it contains, besides descriptions of the turbines of PONCELET, THOMPSON, FONTAIN, JUVAL, FOURNEYRON, etc.. detailed directions for the construction of turbines, tables of square and cube roots, surface and mean velocities of water, the discharge of water over weirs, velocity of water through sluices, formulas, dimensions and tables for overshot and undershot wheels, the diameter of spur-wheels, and the strength of cast-iron teeth.

RECOLLECTIONS OF PAST LIFE. BY SIR HENRY HOLLAND. New York; D. Appleton and Company, 1872.

The celebrated physician-in-ordinary to the Queen of England whose recollections are here recorded is President of the Royal Institution, Fellow of the Royal Society etc., etc., and has reached the ripe age of eighty-four years. Both his long life and his numerous distinctions have brought him into personal acquaintance with many events and personages of historic interest in England and America; and this circumstance lends peculiar interest to his gossippy reminiscences. He has travelled for more than twelve, and actively practiced his profession for more than fifty years; and looking back upon this long career, he declares that his life has been a prosperous and happy one. It is not often that an old man, strong in intellect, satisfied in ambition, unsoured by disappointment and unclouded by cynical views of men and affairs, reviews so cheerily and charitably the scenes of his life; and if Sir HENRY HOLLAND'S book had no other merit than this sunny atmosphere, it would still be a wholesome and useful contribution to literature. But it is interesting in itself from the vast variety of topics which it touches, though superficially, yet with good taste and intelligence. Voyages and travels to Iceland, all parts of Europe, Turkey, Asia Minor, and the United States, and personal recollections of ALI PASHA, SCOTT, LOCKHART, JEFFREY, PLAYFAIR, DUGALD STEWART, ALISON, the EDGEWORTHS, the BONAPARTES, MURAT, the Countess WALEWSKI, Queen CAROLINE, CANNING, King LEOPOLD, GUIZOT, THIERS, EVERETT, WEBSTER, CLAY, CALHOUN, BUNSEN, JEFFERSON DAVIS, TALLEYRAND, PALMERSTON, COBDEN, COLERIDGE, WORDSWORTH, BYRON, MOORE, CAMPBELL, ROGERS, CAVENDISH, WOLLASTON, DAVY, PAYNE KNIGHT, SYDNEY SMITH, MACAULAY, Lord and Lady HOLLAND, Sir PHILIP FRANCIS, MACKINTOSH, WHEWELL, MALTHUS, ROMILLY, ERSKINE, JOANNA BAILLIE, Mrs. SOMERVILLE, HUMBOLDT, and many other persons distinguished in literature, science or politics, give to these desultory chapters the charm of a quiet, rambling talk with their genial author. Who would not enjoy listening to some kindly and talkative old sage, who could tell how all these people had personally impressed him? Who would not be willing to let him monopolize the conversation, and flit from topic to topic, as should suit the whims of age? That is just what the venerable Doctor does in this little book. The reputation of Sir HENRY HOLLAND as a profound and acute writer on professional and scientific subjects lends an additional charm to these lighter recreations of his pen. We all feel the fascination of "small talk" from great men; and the chapters in which HOLLAND reviews his own published and unpublished writings evidence how deeply he has studied the problems of his profession, and the scientific questions of the day. Among the manuscripts he has never published are essays on Unity of Creative Power; Plurality of Worlds; Natural Theology; Differences of Religious Belief; Evil in the World; Life on the Earth, and the Relation of Man to Other Animals; Perfectibility of Man; Animal Instincts; Generation and Origin of Species; Sleep and Dreaming; Mental Functions in Relation to Time; Matter, Force and Motion in Physical Phenomena; Atomic Theory; Ether and the Electric Element. It would be difficult to draw up a list of subjects more attractive to thoughtful and inquiring minds; and acquaintance with the personality of the author, made through the medium of his "Recollections," increases the interest with which we regard his views on such matters. But the rapid progress of scientific discovery necessitates perpetual revision and modification; and he has left it to his son to decide whether these papers shall be edited and published after his death. May he live till they are utterly out of date.

PRE-HISTORIC TIMES, *as Illustrated by Ancient Remains and the Manners and Customs of Modern Savages. By* SIR JOHN LUBBOCK, BART., M.P., etc. New York: D. APPLETON & Co. 1872.

The author of this book is a distinguished original investigator in the field it covers. His position as Vice-President of the Royal Society, Vice-President of the British Association and President of the Anthropological Institute is evidence of the estimation in which he is held by his scientific brethren. In the treatment of geological evidence he is not equal to SIR CHARLES LYELL; and in the department of the history of civilization—or what is called the science of culture, EDWARD TYLER and some of the German authors are his superiors; but he is fully competent to make such a work as this both instructive and interesting; and, availing himself with a frank and courteous appreciation of the results of all scientific inquiry in his line, he has woven the whole into a fascinating treatise. The present is a second and revised edition—and the American publishers have made of it a very handsome volume, the beautiful typography of which is worthily illustrated with hundreds of wood-engravings and lithographic plates.

THE POPULAR SCIENCE MONTHLY; *conducted by* E. L. YOUMANS. New York. D. APPLETON & COMPANY. May, 1872.

This is the first number of a new magazine started "to help on the work of sound public education, by supplying instructive articles on the leading subjects of scientific inquiry. The first number contains a paper, specially contributed by Herbert Spencer, on "The Study of Sociology—Our Need of It," which is characterized by all the learning and force in thought and style which have put this author at the head of the philosophical writers of the age. This is the introduction to a series of articles from his pen on the subject of Social Science, which have never before been published, and which alone will be sufficient to ensure to the magazine a high literary position and numerous readers. The remainder of the number contains a fascinating variety of selected articles of recent date, immediate interest, and literary and scientific value. PROCTOR on the last solar eclipse; Rev. T. W. FOWLE'S splendid essay on Science and Immortality; QUATREFAGES' lecture on the Unity of the Human Species; and many other suggestive and instructive papers on timely topics, together with editorials, reviews and scientific miscellany, constitute a most attractive number. The magazine will be published for one year as an experiment, and we trust its success will be such as to warrant its permanent continuance.

The Region of the Late Earthquake.

THE late remarkable earthquake in Inyo County will no doubt attract the attention of the world to that locality, and any points concerning its geological formation, appearance, characteristics, etc., will be of interest. Mr. HENRY G. HANKS, who resided in that part of the country for a number of years, has given us a few notes, the result of his personal observation, which give a very good idea of the volcanic nature of a region of which but little is known.

Those who have visited Owen's Valley have been struck with the strongly marked evidences of intense and comparatively recent volcanic action for a hundred miles north and south of Lone Pine. As far north as Owen's Lake very ancient outflows of lava form the surface of the country. The valley in which this lake is situated, is a circular basin about fifty miles in diameter, surrounded by low mountains. The body of water, which is about 25 miles long, lies near the southeast side. Near the lake is a remarkable mountain, which from a distance seems to be loose sand, but which on a close examination proves to be volcanic ashes and pumice, a disintegrated portion of which forms the soil of the valley in which it is situated.

Let two or more intelligent observers express their opinion of this locality in ordinary conversation and they would soon be unanimous in the opinion that Mono Lake valley is in itself a volcanic crater and that all of the volcanic rocks seen on every side had their origin in it. From its margin, in every direction except west, streams of lava have flowed across hills and plain. For many miles the whole country is covered with blocks of lava, pumice, obsidian and trap. During the eruption, valleys were filled up and what were formerly mountain tops, are now outliers, projecting like islands above the frozen sea of lava.

About nine or ten miles above Camp Independence are a number of volcanic cones which have every appearance of having been in recent action. "The Volcano" is a cone which stands in the valley apart from the Sierras. This cone has evidently formed itself. I have never been to the summit although I have often wondered at the immense outflow of lava which has congealed upon its sides. From all these cones, black pathways to the valley reveal the course of the lava streams which must have spread devastation and ruin in their wake. On the Inyo side a single crater appears, from which, however, an astonishing quantity of lava has been thrown out.

The waters of Owen's river, which flow down from the high Sierras as pure as the snows that give them birth, begin to collect the soluble salts from the decomposing lavas even before they reach the level of the valley, as the stream has cut a deep cañon through the peculiar lava before mentioned, which is several hundred feet deep. During the summer, when the freshets occur, and the rain overflows its banks, miniature lakes are formed, which, drying as the waters return to the channel, deposit an incrustation of alkali and salt which gleams in the bright and fervid sunshine like patches of snow. At Black Rocks the waters which burst out from under the lava are nauseous and alkaline. This alkaline solution mixes with the already contaminated waters of the river and increases its impurity. When it reaches the barrier which checks its further flow, the waters spread out and form Owen's Great Lake. The river is extremely crooked. In traversing 84 miles of latitude it flows hundreds of miles, so circuitous is its course. Every mile adds to its impurity until it deposits its collected salts in the lake. The heat of the sun maintains an irregular equilibrium. The water soon becomes saturated and supersaturated and deposits the matter it can hold no longer in solution, in the form of a remarkable travertine, which coats the rocks and grows like coral upon any object which offers itself as a nucleus.

The waters of the lake are remarkable, having a specific gravity of 1.060, with the appearance of a thin yellowish oil. An analysis shows it to consist of potash and soda with a trace of magnesia and sulphuric acid and chlorine with traces of boraic, phosphoric, silicic and hydrosulphuric acids.

There is a remarkable similarity between this lake and the Dead Sea, not only in the lake itself, but its surroundings.—*Scientific Press.*

THE ENGINEERING AND MINING JOURNAL.

ROSSITER W. RAYMOND, Ph. D.,
WILLARD P. WARD, M. E.
Editors.

PUBLISHERS' ANNOUNCEMENT.

THE ENGINEERING AND MINING JOURNAL *is projected in the intent of furthering the best interests of the Engineering and Mining public, by giving wide circulation to original special contributions from the pens of the ablest men in the professions. The careful illustration of new machinery and engineering structures, together with a summary of mining news and market reports, will form a prominent feature of the publication.* It is the Organ of the American Institute of Mining Engineers, and is regularly received and read *by all the members and associates* of that large and powerful society, *the only one of the kind in this country.* It is therefore the best medium for advertising all kinds of machinery, tools and materials used by engineers or their employees.

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Office Removal.

We desire to call attention to the removal of our office from its present location to No. 27 Park Place, which will take place on May 1st.

American Institute of Mining Engineers.

The arrangements for the May meeting are so far advanced as to insure a profitable and pleasant time. Among the attractions of this meeting, besides the usual proceedings, will be excursions to the Bridge caisson, the works at Hallet's Point, and visits to various mechanical and metallurgical establishments, to the Columbia School of Mines and to the Stevens Institute of Technology. Mr. ABRAM S. HEWITT, one of our most distinguished members, has invited the Institute to an evening reception at his house, when many of the leading scientific and professional men of New York will also be present. The occasion will be intellectually and socially memorable; and will lend luster to a meeting which there is every reason to expect will be the most brilliant and successful in the history of the Institute.

Schellen's Spectrum Analysis.*

This is one of the most beautiful and interesting scientific books ever published in this country. It equals in splendor of typography and illustration even that class of science picture-books which are intended to dazzle the eyes of purchasers, while, unlike those delusive wares, it possesses a real and permanent value. It not only contains the latest discoveries and achievements of spectrum analysis, notoriously the newest and most rapidly progressive of scientific investigations; but it contains them in a form characterized by clearness of statement and logic of arrangement. This is rare in books that present popular accounts of the novelties of science. Take, for instance, FIGUIER'S romances, or any one of a dozen geological, astronomical, or chemical wonder-books. They are almost as bad as fashionable illustrated lectures. One rises from their perusal with his head full of antediluvian monsters, or his eyes dazzled with calcium lights of rhetoric; but one does not get from them any comprehensible statement of the relations of the stunning facts one has been called upon to admire. Now a book may be got up on this vicious plan, and yet be indispensable to scientific amateurs, if it happens to be the only one within their reach, containing a compilation of the latest news in any branch of inquiry. Not everybody can afford to rummage among magazines and technical journals and volumes of proceedings for the isolated records of progress which have not yet become incorporated into standard works. If anybody will do this, and compile the results into even a bad book, his work will be valuable for a while—namely, until some better one appears.

But when such gathered materials are digested, arranged and welded together in logical form, by an author who understands the subject, the book so produced can never be entirely superseded. Now, Dr. SCHELLEN'S work on Spectrum Analysis possesses the elements of both immediate and permanent value. It is new, comprehensive, and trustworthy. By reference to the catalogued literature of the subject, we find that there are lectures and memoirs by twenty different authors on the general topic of spectrum analysis; sixty-one authors have written on direct spectra; twenty-eight have made publications on absorptive phenomena; twenty-six on the spectrum of the sun; four on those of the solar spots; five on the total eclipse of 1868, five on that of 1869; ten on the corona, etc.; seventeen on the constitution of the sun; five on the spectrum analyses of the moon and planets; eleven on that of the fixed stars; four on that of nebulæ and clusters; five on that of comets; three on that of meteors and falling stars, twenty-six on apparatus; thirteen on the spectrum of the electric light; three on the spectrum of lightning; four on that of the aurora; five on the microspectroscope; seven on physiological spectroscopy; and five on the application of the spectroscope to technology. It is true that in this list the names of writers who have treated different branches of the subject are repeated; but on the other hand the list is by no means complete, and most of the authors numbered have published numerous separate memoirs. Of course this book of Dr. SCHELLEN'S does not contain everything that is in all these treatises; but it may be said that it contains something from every one of them, while it is at the same time so well put together as to constitute an original treatise of itself.

It is not abstrusely scientific; that is, it does not deal with the mathematics of the undulatory light-theory, or of practical optics, even. But if we call it popular, we must disclaim any such meaning as sensational or inaccurate. The range of the work will be shown by an outline of its contents.

Part I. deals with the artificial sources of high degrees of heat and light, including the BUNSEN burner, the magnesium, calcium and electric lights, the electric spark and the induction coil. In each case the best apparatus is carefully described and completely illustrated.

Part II. treats of spectrum analysis in its application to terrestrial substances, explaining in a popular way the phenomena of the refraction and analysis of light, and the spectra of solids, liquids and gases, as well as the laws of color and absorption, and the relation between the latter and emission of light.

Part III. is devoted to spectrum analysis in its application to the heavenly bodies. Beginning with a clear account of KIRCHHOFF'S brilliant solution of the mystery of the FRAUNHOFER lines in the solar spectrum, it reports in succession the steps by which science has advanced to learn the constitution of planets, suns, stars, nebulæ, meteors, lightning, the aurora, and the corona. Almost the very latest observations and improvements are here included. Thus we find the telespectroscope of LOCKYER and JANSSEN, by means of which the solar prominences can be observed at any time, without waiting for an eclipse, and the researches of SECCHI and HUGGINS on the influence of the motion of the stars on their spectra. The solar eclipses of 1868, 1869 and 1870 are described; but not that of December 1871. It seems probable, however, that the observations of the latter event have done little more than demonstrate the corona to be a true solar appendage, a proposition which many astronomers considered as sufficiently demonstrated already.

The appendix contains a mathematical paper by G. JOHNSTONE STOREY, on the Cause of the Interrupted Spectra of Gases, which is somewhat too abstruse for ordinary readers; a Preliminary Catalogue of the Bright Lines in the Spectrum of the Chromosphere, by Professor C. A. YOUNG, of Dartmouth College, and a List of works on Sprectrum Analysis, to which we have already alluded.

We are glad to note that the labors of such Americans as YOUNG and MORTON find full recognition in these pages. No account of spectroscopy could be complete without their names.

The one lack of the book is an analytical index, alphabetically arranged. The table of contents and the list of illustrations are not sufficient for perfect convenience of reference. The illustrations, by the way, are very numerous and very handsome. If the colored plates are in one or two instances inferior to those of the English edition, the printing of the woodcuts, almost without exception, is superior; and there are five interesting full-page portraits, which the English edition does not contain, and which make the reader acquainted with the features of BUNSEN, FRAUNHOFER, KIRCHHOFF, HUGGINS and SECCHI.

* SPECTRUM ANALYSIS in its Application to Terrestrial Substances and the Physical Constitution of the Heavenly Bodies, Familiarly Explained by Dr. H. SCHELLEN, of Cologne. Translated by JANE and CAROLINE LASSELL. Edited with notes by WILLIAM HUGGINS, LL.D., D. C. L., F. R. S., with numerous wood-cuts, colored plates and portraits; also Angstrom's and Kirchhoff's Maps. New York: D. Appleton & Co., 1872. 8vo. pp. 455.

The Sutro Tunnel.

THE report of the Superintendent of the Sutro Tunnel Company for the three months preceding March 1, 1872, shows that the work has been pushed with energy during that period. It was actively commenced in December, and in three months, with an expenditure of $122,828, and the employment of a large number of workmen, amounting in February to 326, considerable progress was made. Taking from WHEELER'S San Francisco Stock Report the latest figures, which include the work done up to March 31, we have the following: Length of tunnel, 2,811 feet; depth of No. 1 shaft, 132 feet; depth

of No. 2 shaft, 307 feet; depth of No. 3 shaft, 156 feet; depth of No. 4 shaft, 150 feet. The tunnel referred to is a preliminary drift, which will be subsequently enlarged in section to accommodate the transportation and drainage which the completed work is to effect. When the four shafts are finished, drifting can be carried on with far greater rapidity. A contract has been made with the Diamond Drill Company for the use of diamond drills in all portions of the work.

Meanwhile the question of governmental aid to the Sutro tunnel is still pending at Washington. The report of the Commission appointed last Summer has been supplemented with a large amount of testimony, taken before the sub-committee on Mines and Mining of the House of Representatives. Both in the report of the Commission, and in their evidence before the Committee, the Superintendents of the Comstock mining companies appear as the determined opponents of the tunnel scheme, going so far as to deny the advantages of the tunnel in every respect.

We do not intend to discuss the question at present. We have always thought the conditions of cheap mining upon the Comstock vein required, while the topography of the country encouraged, the construction of a deep tunnel. The topography certainly has not changed at all; the conditions of mining have changed somewhat, no doubt; but not sufficiently, in our opinion, to overthrow the arguments which have hitherto been conclusive in favor of the tunnel.

Our view is confirmed by an exceedingly elaborate and able treatise on the Comstock vein, its mines and their intersection by the proposed deep tunnel, which has recently appeared in the *Berg-geist* of Cologne, one of the leading mining journals of the world. The author is BERGRATH BURKART, who writes with all the published works on the subject before him, and draws conclusions quite favorable to the tunnel. His criticisms upon the report of the U. S. Commission are rather severe; he blames the Commission for accepting without question the statements of the mine Superintendents, and shows that on the subject of mine ventilation, these gentlemen have made, and the Commission has too confidingly adopted, assertions wholly unfounded in the theory or practice of mining. The particular proposition which BURKART attacks is unfortunately repeated several times in the Report and Appendix, viz: that when the tunnel is done, and the shafts connected with it, the air-current will go straight up the shafts; and that it will be impracticable to carry air to the headings where men are at work. Of course this statement is ridiculous; and we are mortified that a foreign critic should find it in an official and professional document. The superintendents of the Comstock mines are in many instances agreeable gentlemen, good business men, and excellent mechanics and engineers so far as their experience goes. It is their boast that none of them are "scientific theorists;" and no doubt their practical skill is better than mere theory for many purposes. But what they lack, though it may surprise them to hear it, is not theory but practice. If they had had any real practical experience in deep mining and the natural ventilation of mines, they would not have talked such rubbish to the Commission on that subject. When a man pronounces his particular locality to be "an anomaly," says you can't tell which way the air will go in his mine, that a deep tunnel connecting the bottom of his mine with daylight, on a level two thousand feet below the top, will give him no better ventilation than a level connecting the bottoms of two shafts, or that the natural air-current developed by such an enormous difference in altitude and temperature cannot be conducted wherever it is wanted throughout the mine, he is really propounding the wildest kind of theory; and what he needs is practice.

The amount of water reported in the working mines, and the alleged cost of removing it by pumping, are surprisingly small. But the report refers to a period at the close of three years of remarkable drought; and hence the basis furnished for calculations as to drainage cannot be accepted without hesitation. Nor do the figures given for the cost of pumping fairly represent all the indirect expense incurred by maintaining the pumping system. Moreover, an increase in the number of miners working would greatly increase the aggregate expense of pumping while a tunnel would drain all the mines as easily as one.

As we have said, this is not intended as a complete discussion of the subject. There are many other points involved, and among them a bitter quarrel between Mr SUTRO and the mining companies, with which we have no concern, but which unfortunately complicates and obscures the simple questions of mine engineering involved in the construction of a deep tunnel.

About-Town Jottings.

BUSINESS AND PERSONAL.

Personal announcements and business notices inserted in this column, at fifty cents per line.

Root's Wrought Iron Sectional Boiler, manufactured by the Root Steam Engine Co., 500 to 510 Second Avenue, New York.

Geo. F. Blake & Co., 79 Liberty street, Steam Pumps of every size and capacity, for all purposes.

Utica Steam Engine Co. (formerly Wood & Mann Steam Engine Co.,) 42 Cortlandt street, N. Y.

Post & Goddard have removed to No. 111 Liberty street. Dealers in Taps, Dies, Reamers, Drills and supplies generally.

American Submerged Pump. Power attachment—cheapest and best in the market, 55 Chambers street, N. Y.

Roper Caloric or Hot Air Engine, 124 Chambers St.

Blake Bros., New Haven, Conn., manufacture Stone Breaker for crushing ores and minerals of every kind into small fragments, preparatory to their further comminution by other machinery.

American Institute of Mining Engineers.

OFFICIAL BULLETIN.

Announcements to Members and Associates.

I. It is believed that several names of members and associates elected at the Bethlehem meeting in Aug., 1871, have been accidentally omitted by reason of the loss of a portion of the records of that meeting. Such persons, or their friends, are requested to communicate with the Secretary.

II. All members and associates who have not paid their dues are requested to do so at once, by sending in postal orders, or check, or money, ten dollars to the Secretary.

All members and associates who pay their dues for each current year, strictly in advance, will have sent to their address, regularly and weekly, the ENGINEERING AND MINING JOURNAL, which is the organ of the Institute, and will contain the proceedings and transactions, and all important papers read before the Institute, and all notices of meetings. Back numbers cannot, as a general rule, be sent.

III. It is expected that the more important papers read before the Institute, and the debates thereon, will be published in annual or semi-annual volumes to which those members and associates will be entitled who have paid their dues.

IV. Authors of papers are requested to notify the Secretary in advance of the meetings, giving the subject and length of their papers. Attention is also called, in this connection, to Rules 12 and 13.

The annual meeting of the Institute will be held in the city of New York, commencing on Tuesday evening, May 21st, at 8 o'clock, in the Cooper Union Building, at the head of the Bowery.

MINING SUMMARY.

Nevada.

From the Elko *Independent* of April 6th.

SHELL CREEK.

From James Leffingwell, who came down from Shellbourne last week, we learn the following in regard to that promising mining locality.

The Wide West, on Ruby Hill, has a shaft down on it 30 feet, showing good ore all the way. The ledge is ten feet between the walls, and work has been resumed on it, and will be prosecuted vigorously. The ore is of a high grade, and owners expect to reap a rich harvest from its working this Summer.

The Ajax, belonging to the same cluster of rich mines discovered last Fall, although but partially prospected, is looked upon as one of the most promising mines in the district. It is owned in part by John Murphy, the old prospector and discoverer of the celebrated Murphy mine in Smoky Valley. This ledge has a shaft sunk on it ten feet deep, showing at that depth rich ore, eight feet between casings.

The Silver Wreath, another valuable mine, located in the same vicinity is being rapidly developed, showing good ore the whole depth of the shaft, which is now down 20 feet, with a seven foot ledge between the walls.

The Lookout is situated in the same neighborhood, showing a ledge of rich carbonate ore, five feet wide. A shaft 30 feet deep has been sunk on this mine, and the owners are busily at work going down.

Near Schellbourne the most promising mines are as follows:

McHahn, which has a shaft 15 feet deep and is ten feet between the walls; Woodburn with incline 12 feet, shows a rich body of ore, $240 per ton, six feet wide; Ontario, with incline 30 feet, shows a 3½ foot ledge, that assays from $1,500 to $2,100. This mine is located in the vicinity of the Ferguson spring, which affords 30 inches of water the year around.

The St. Paul is another promising ledge, situated north of the overland road. Work already done on it demonstrates it to be a true fissure vein of high grade ore.

Queen's Springs, four miles southeast of Schellbourne, is a very promising camp, containing a number of good ledges, which are being developed as fast as labor can do it. T. R. Posey, an old mining expert of this State, is located here in the interest of several mining companies, and speaks very highly of the mines.

Idaho.

From the Idaho *World* of April 4.

The miners are resuming work in every direction around our city, and the bright light from the pitch-wood fires of the miners who work at night is a cheerful sight after a long and gloomy winter. The warm spring weather is causing the snow to disappear rapidly from all the south hill-sides, and large quantities of water are flowing down More and Elk creeks, while the gulches in every direction, fed by the melting snow on the hills, add their quota to the general volume. On Buena Vista Bar, HEADEN & Co., PEAK & Co., and one or two others this side of Warm Springs, are working night and day, and above them four or five Chinese companies, employing about 130 men, have been running for two or three weeks past. Above town, on North Elk, SILSBY, BARROWS & Co., who leased BALDWIN'S ditch, are at work near the mouth of Cuddy's gulch, and in that immediate vicinity PETER RUSH & Co., JAMES COLLINS and PETER DONOHOE are also at work; RUSH & Co. running day and night with a good head of free water, having already run off a large extent of ground. On Deer creek, above that point, FRANK TANNER & Co., CHARLES PREUSS & Co., WEBSTER & COWAN, SWAIN & Co., and BELL, are making the best use of their time and water; while in Spanish gulch, Stirman and four or five other companies are prosecuting work in a lively manner. On Bear Run, KELLER & BIDWELL and WEST & RALSTON have been working for ten days or two weeks past, and are running any amount of tailings down into the upper portion of Main street. None of the long ditches have, as yet, been cleaned out, but work is now being done on the Alderson ditch, and it is expected that they will get the water through in from ten to twelve days. Next week work will also be commenced on the Big Ditch (or old Christie ditch) for the purpose of getting the water through as early as possible, but nothing will be done on the More creek ditch for two or three weeks yet. REV. WILLIS has got the water through his upper ditch, upon Gold Hill, and is working his claims near Lincoln gulch, and K. P. PLOWMAN expects to have water running in his

ditch in a few days, to commence work on his claims in Bear Run gulch. Up More creek, above the junction of Elk creek, no claims have, as yet, commenced, though TOMPKINS & LAMBING have been, for weeks past, getting everything ready to open their hydraulics, and they expect, in a short time, to get water enough through their ditch to commence work. There are now in this camp from two hundred and fifty to three hundred men at work, and in a couple of weeks more, if the present mild and open weather continues, double that number will be engaged, including, of course, Chinese. There is an abundance of snow in the mountains, and everything augurs well for a prosperous mining season. At Pioneer City the snow is still about three and a half feet in depth, and no mining operations in that camp will commence for probably a couple of weeks yet. At Placerville and Granite Creek, we learn that the season is also backward, with little prospect of active mining operations commencing for ten days or two weeks hence, but good accounts will be received from all the Basin camps when the claims are clear of snow and the ditches running full of water.

SUMMIT FLAT.

From W. A. NUNNALLY, Esq., we learn that Messrs. JOHNSON, FREEMAN and CHARVALHO, owners of the discovery claims on the Golden Era ledge, in Summit Flat District, have been at work on the ledge during the entire winter. They have run a tunnel a distance of some two hundred feet through the slide where the ledge had broken off, and at last accounts, from all indications, expected to strike the true ledge on last Saturday, and were confident of striking it rich. The snow in that section is from ten to thirty feet in depth, while at Summit Flat it is from twelve to eighteen feet deep. JOHN MUIRHEAD has been engaged, during the winter, in taking out ore from the King ledge, at Summit, which is said to be the richest rock ever extracted from that mine, and will crush it in the old Goodwin mill, Mr. MUIRHEAD having leased the mine and mill from GOODWIN. We shall expect to hear of some big clean-ups from quartz in that section when the mills commence running.

Colorado.

From the Caribou *Post*.

WILLIAMSBURG.

The industrial interest of the opening season seems to be centering on the new silver mining camp, called Williamsburg, situated 16 miles west from the town of Boulder, and 3 miles north of THOS. J. HILL'S ranch, on the North Boulder Creek, by the old road to Ward. Last October, BOLUS MITCHELL and GEORGE WILLIAMS, attracted by specks of sulphuret of silver, previously observed in the blossom of this section, commenced prospecting here. The vein they have most developed is called the Washington Avenue. It is opened by 3 shafts, 50 feet apart—one 25, one 15 and one 12 feet deep—the last being the depth at which solid mineral is obtained. What seems remarkable about the lode is that a body of silver ore so pure, rich, and apparently so extensive, should be found so near the surface of the ground. The mineral is composed of the grey sulphuret of silver, argentiferous galena, zinc blende and other silver ores common in Colorado. It is very clear, pure mineral, remarkably so, and quite as remarkable for its richness. The pay rock commences about 10 inches in thickness, gradually widening as depth is gained. It is evidently a true silver vein, traceable on the surface for about half a mile, and all claimed. Visions of fortunes are opened which, it is hoped, may soon eventuate in the reality. To appearance the silver bearing area of this section is very extensive. For both east and west of present workings, on the high divide between North Boulder and Four-mile creeks, similar blossom rock is found, but for a month yet there will be too much snow to prospect to advantage. Some parties are opening veins near the Washington Avenue. The St. Lawrence is the name of a location made by Tobie, Benson and Crary. These lodes are in the old Pennsylvania District of this county, near the Pennsylvania lake, at the head of the Pennsylvania gulch, prospected in the early days, and abandoned because the abundant blossom did not pay in gold mills. The ranchmen of this region have a wagon road nearly completed down the Pennsylvania gulch to the Four-mile creek road; thus enabling, by a water-grade route, easy and natural communication with the Boulder valley. Ores designed for shipment to the east could be transported to the town of Boulder, to which point rails will soon be laid, at a cost of about $5 per ton. But the ore market will be sought in the mountains. The mines opening are only a mile and a quarter from HENRY COMO'S ranch on the North Boulder stream, and about 5 miles from the Caribou mill at Middle Boulder; being from that point the same distance north that the Caribou mine is west. The Black Hawk market is also of easy access—the mines being situated on the south of all the heavy hills which hinder hauling ores from Ward to HILL'S furnaces. Heavy forests make a part of the natural wealth of this mineral section which will eventually be made available in smelting the ores.

Montana.

SILVER MINING AT FLINT CREEK.

From a correspondence dated Phillipsburg March 15 in the Helena *Herald*.

A few months ago the place was dead to the outside world: a few mine owners remained and listlessly toiled away, but seemingly without any settled plans or certainties as to when they would realize the fruits of their toil. Soon, however, things began to change. Energy became infused into the camp and enterprise manifested itself in the erection of a small mill and in the beginning of another on a larger scale. Without adequate means, and suffering under many an adverse circumstance, both were completed; the smaller one, going by water, was only finished as its motive power failed, and had no fair trial. The other was completed at the beginning of winter, and owing to many causes, is necessarily far from perfect; but still, constructed as an experiment, it has proved a greater success than was anticipated by its sanguine projector. The fact has been demonstrated that the base metal ores of the district can be successfully and profitably worked right here, thus saving the expense of freighting them away.

Lyon's mill (owned by the Imperial Company) has been crushing ore some time, but comparatively little has been amalgamated heretofore, owing to a lack of quicksilver. Having secured that necessary adjunct, it is now running day and night, turning out bullion of superior fineness.

The St. Louis mill, under the management of BROWN & PLAISTED, has just started up, crushing ore from the Eastern Comanche. That these energetic gentlemen will make the mill pay is firmly believed. The horrible condition of the roads for the past few weeks has thrown both mills far behind in time, as important supplies could not be got in to start up with.

Work on the Eastern and Western Comanche is being prosecuted. A shaft is being extended on the Hope, and the newly discovered Little Emma lode is likely to prove far from small, as day by day it shows up better. The Trout remains the leading richest *fish*, both in the camp and Territory.

The above are the only ledges which have been worked on this winter. The old pioneers, who had become weary with long delays and wandered to other scenes, are straggling back one by one, and manifest a disposition to wander no more. There are about one hundred men in camp now, most of whom are working away vigorously.

Another mill will be erected here the coming season by a Wheeling company, organized by Mr. HERVEY, of Georgetown fame. The gold mill there will be moved here and additional machinery put in to make it a first class silver mill.

Mr. OLIN, who began the construction of a foundry, has changed his plans, and will have a smelting furnace, with force blast, completed during the ensuing week. He says he will "either smelt the ore or melt the furnace down.

Arizona.

From the Prescott *Miner* of March 16.

YAVAPAI COUNTY.

The Tiger mine is still "panning out" plenty of shipping ore, some 20 tons of which were shipped this week by MILLER & BROS. train. The Placer mines are taking out considerable gold. Vulture mill, at Wickenburg, is still running.

PIMA COUNTY.

I. Q. DICKASON brought some very rich specimens of silver ore from a mine belonging to himself and M. B. DUFFIELD, near Tucson. Have not seen the specimens, but Colonel BIGELOW, who has, says they are exceedingly rich. The mine is said to be very large.

MARICOPA COUNTY.

Work is progressing on the Silver Queen and other lodes.

MOHAVE COUNTY.

Our letters from Wallapai District are very encouraging in tone. Wagons, pack-trains, etc., conveying people, were constantly arriving from California and Nevada. A steamer had arrived from Arizona city with provisions, etc. An immensely large mine—supposed to be one formerly worked by the Jesuits, had been discovered. Its location is not far from Mineral Park.

ITEMS.

D. C. MORELAND and GEORGE A. HAMMOND, who arrived here one day this week from the Tiger mine, say that, at the time they left, the tunnel was in 216 feet from the bottom of the deepest shaft, and that a cut—to find out the width of the vein—had been started.

JAMES ANDERSON has been making good wages by working "Benjamin" ore, out of which he has been getting from 65 cents to $1 per pound in silver, which, according to accounts, is more than the ore yielded in San Francisco.

California.

MINES IN NEVADA COUNTY.

We extract the following items from a correspondence in the *Scientific Press* of April 6.

UNION GRAVEL MINE.

The above named mine is located at Relief Hill, 3 miles east of North Bloomfield, has nine owners, one of whom, M. AREMAN, is Superintendent. It was first located in 1856, and has been successfully worked ever since. At present writing they are working 10 men drifting, and washing with one of FISHER'S "Hydraulic Chief" monitors; will add another monitor next month. This claim has averaged $1,200 per month, and last month $2,500 was cleaned up. This together with four other claims at present working here, are bonded to an English Co. for $250,000; verily the English will soon own us, body and boots.

BUCKEYE QUARTZ MINE.

This mine is located two and a half miles north-east of Nevada city, in Willow Valley. R. W. TULLY, banker of Nevada, and JAMES KITTS are proprietors; the latter is superintendent. They have excellent hoisting works on the mine (put up in October last) which are run by an engine of 16 horse-power, their principle shaft is dow 210 feet, at an angle of 45 degrees; this ledge will average four and a half feet, and runs as high as 10 feet in width; now running levels, and employing regularly 9 men. When stoping, they can take out 20 tons of rock daily—which has averaged thus far $13.25 per ton, and now prospects better; milling the rock at the Oriental mill, one mile away.

THE DEFIANCE QUARTZ MINING COMPANY,

located on Osborn Hill, one and a half miles southeast of Grass Valley is superintended by Con. REILLEY. They give the following as their experience in the use of Giant No. 2 Powder vs. Black Powder. They are sinking a perpendicular shaft, now down 112 feet; at that depth they took out 30 tons of rock, by single hand drilling, and No. 2 Giant Power for blasting, at a cost of $20 per ton. The same number of tons taken out above that, with large drills and the use of black powder cost them $40 per ton. From 6 to 8 men are regularly employed, and three of whom I conversed with, acknowledged their willingness to work this powder, and stated they were in as good health as when they began the job.

CARNEY & GOODSPEED'S

cement mill and mine are located at Hunt's Hill, six miles east of Nevada city. They have an 8-stamp mill run by water power, with a 24 foot hurdy-gurdy wheel on a cam-shaft, without other gearing. This mill has a capacity of and is now crushing 50 tons of cement every 24 hours, which averages $5 per ton. This company have a tunnel in 800 feet, at which point they are drifting in different directions, working regularly 28 men. The gravel or cement, is taken out of the tunnel by car to the mill, which is located at the mouth of the tunnel. This tunnel is rather badly ventilated at present, for the reason that but 15 feet fall can be had for the water to run their air pipe with. Different arrangements will shortly be made for better ventilation. At present using black powder, but are about to experiment with giant for their cement blasting.

BIRDSEYE CREEK G. M. CO., (Limited.)

The possessions of this company extend from near Hunt's Hill to the vicinity of Little York, and comprise all that portion of the deep channel "Blue Lead" at Red Dog, You Bet, and the vicinity beyond. The entire length of the company's claims is about four miles, all the bed rock of which will not probably be seen for the next hundred years. The company is an English one, having its principal office in London. It is managed by a Board of five trustees, and is ably superintended by J. A. STONE, Esq., of You Bet. At present they are working three sets of claims, viz.: the "Uncle Sam," of which GEO. H. POWERS is foreman; "Brown's Hill,"

FRANK ENNIS, foreman; and the "Neece & West," J. R. FLAGG, foreman. In the above named claims there are from 25 to 30 men regularly employed, running from five to six hydraulic monitors, carrying from 250 to 400 inches of water each. This company is at present engaged in running a bed-rock tunnel to the "Neece & West," that will, when completed, drain both that and the Brown's Hill claims. The dimensions will be 1,100 feet long, 7 feet wide by 8 high, 260 feet of which is now completed; a hard slate formation exists as far as pierced. In addition this company own the "Independence" and "Bunker Hill" property, and extensive claims at Sweetland.

As to the amount of bullion taken out, but little is known to the outside world; but when under their former ownerships, they did pay extensively, and as they never looked better than they do now, the supposition is that our English friends are reaping good pecuniary benefits from their enterprise.

LITTLE YORK WATER & MINING CO.

The principal works and office of this company are located here (Little York). Its owners are R. F. KNOX of San Francisco, MARTIN HOYT, of Virginia, Nev., W. W. COZZENS and G. H. ATKINS of Little York. Mr. COZZENS is manager, and Mr. ATKINS general Superintendent. The possessions of the company comprise, Little York, Christmas Hill, and Liberty Hill—about 600 acres of mining ground covered by United States Patent—extending from Little York to Liberty Hill, a distance of 4 miles, but not connected all the way by pay gravel, a high mountain causing a break in the channel. The channel proper is not over 300 feet wide at this point (Little York), but a deposit of blue gravel exists—nearly a mile in width—which, at points, is several hundred feet deep and extending high up on to the rim rock. At present, working 4 sets of Hoskin's "Little Giant" monitors, one in each claim, one of which is used under a pressure of 340 feet, employing a 4-inch nozzle through which 650 inches of water is forced. They are employing regularly about 50 men and using the most improved machinery and blasting agents, such as monitors, under-currents, giant powder, etc. They also use an improved coupling band not original here, but a patented invention considered indispensable for coupling pipe, and certainly the cheapest and most convenient affair for the purpose that I have ever seen.

The San Francisco *Bulletin* of April 5 has the following budget of Californian mining items:

ALPINE COUNTY.

The finest and best body of ore opened in Alpine, says the *Miner* of March 23d, was struck in the Silver Glance mine this week. It is a continuation of the vein being worked at the Monitor, No. 3.

A lively season is soon to open up for Monitor, and continue thenceforward continually. Not only will the Tarshish, M. & N. W., Leviathan and Globe, which have ore in sight, work a large number of men—from 25 to 75 each—but the Sovereign, Mountain, American, Morning Star, Winchester, Marion and others, are already talked of as sure to start up.

The new plan adopted for working ores at the Monitor is, as far as tried, proving itself much more superior in efficiency and economy to the one first tried. By this plan the mill will be able to work daily from 30 to 40 tons, whereas by the other it would crowd it to get through 12 tons.

The American mining property, among which are some of the most promising claims in this district, has recently passed into the hands of a New York capitalist, and it is hoped no time will be lost in putting a gang of men at work to prove the intrinsic value of the investment.

AMADOR COUNTY.

The Oneida mine, says the Amador *Ledger* of March 30th, has a large amount of rock on hand, and when the mill starts, rich results are expected.

The State of Maine mine is very rich. The ledge is a fissure vein, and very finely defined.

The other day we leisurely strolled up the road leading to Volcano, and when near the bridge across Indian Gulch, we came "onto" three of Bret Harte's "Jim Nyes," with sluices stretched along the gulch, and busily at work with pick and spade. We questioned the boss as to how they were making it, and he replied in a purely Mongolian style: "O, no heepe catchee coarse gold; too muche fine gold, all ee same, Melican man. No hab got water to paye." "Well, my humble Heathen, how much do you make?" Me catchee three dollar one man, no belly good. The ground being worked, we are told, has been worked over now the sixth time, and yet these moon-eyed Heathens can work it again and make $3 per day to the man. "Melican man no belly good, ne sabe him what I know."

On Sunday night last about 12 o'clock, a very destructive fire occurred in the Summit mine, situated on the summit between Sutter Creek and Jackson, which destroyed the hoisting works and buildings, and damaged the engine and machinery. The fire was undoubtedly the work of an incendiary.

The tunnel or hill claim of Senor Domingo Araus, situated at Jackson Gate, about two miles north of town, after a run of fifteen days, cleaned up a little over $1,000. This mine is worked by three men, who draw out the dirt and pile it up until they accummulate sufficient to make a fifteen days' run, when they wash it by the hydraulic process. This mine has been a paying institution for years.

CALAVERAS COUNTY.

With the opening of spring, says the Calaveras *Chronicle* of March 30th, comes the intelligence of the resumption of active operations upon the quartze lodes in the Railroad Flat district. First and foremost stands the Petticoat, a mine that has been worked, with varying fortunes, for a number of years. The Petticoat is supplied with steam hoisting works and a good mill furnished with all the latest appliances for saving gold. A great deal of money has been expended in prospecting the lead and getting it into shape to work to advantage, the mine having never yet proved self-sustaining. During the past winter, however, developments have been made that warrant the belief that the Petticoat will speedily become a paying institution. Next in importance comes Prussian Hill, a mine that is even exceeding the hopes and expectations of its owners. A large amount of rock has been taken out during the winter, but as it has to be hauled about five miles to mill, and the roads have been impassible, none of the ore has been crushed. We have it from good authority, however—from competent judges not interested in the mine—that the rock is immensely rich and any amount of it in sight. Work is progressing favorably on the Wolverine, located in Wet Gulch. The shaft has reached a depth of about 200 feet, and a level is now being run from the bottom of it. The rock prospects well, and the indications are good that the vein is a true one. Rock taken from the mine is now being crushed in Harris' mill at Sandy Gulch. The old Free and Easy mine has been purchased by Mr. Porteous, who is working it to as good advantage as the lack of proper machinery will permit. Good rock is found in the bottom of the shaft, and the lead appears to be widening; but water is so troublesome that progress is slow.

The proprietors of the Prussian Hill mine, near Railroad, have purchased the French Mill, at Rich Gulch Flat, and will move it to their works as soon as the condition of the roads will permit.

INYO COUNTY.

The Inyo *Independent* of March 23d says:

The assay value of the first-class ore now being extracted from the Whittekind mine, Cerro Gordo, is 406½ ounces silver per ton, the second class running 188 ounces. The ledge has just been tapped, also, in the new tunnel, but we are not apprised of the value or extent of the ore.

MARIPOSA COUNTY.

In and about Washington mine forty men are employed. The lower level is about 240 feet in depth. The quartz makes an excellent showing of free gold and sulphurets.

Ex-Assemblyman Pool struck a very rich quartz claim early in the winter, in his garden. He has pounded out several thousand dollars, in a hand mortar, and crushed about thirty tons, which average two ounces of pure gold to the ton.

We have been shown, says the San Joaquin Valley *Argus* of March 28th, some specimens of gold by James Chamberlain, the sight of which caused the "gold fever" in our system to rise to an almost ungovernable height. Two of the chunks were quartz pebbles, one of which contains about 2¼ ounces, and the other about 1¼ ounces of gold. In addition to these chispas he showed us an ounce of finer gold, ranging from one dollar chunks down to the finest of particles. Mr. Chamberlain is operating in the great gravel range in Mariposa county, in the vicinity of New Year's diggings, and expresses the belief that exceedingly rich deposits will be discovered wherever water can be had for sluicing.

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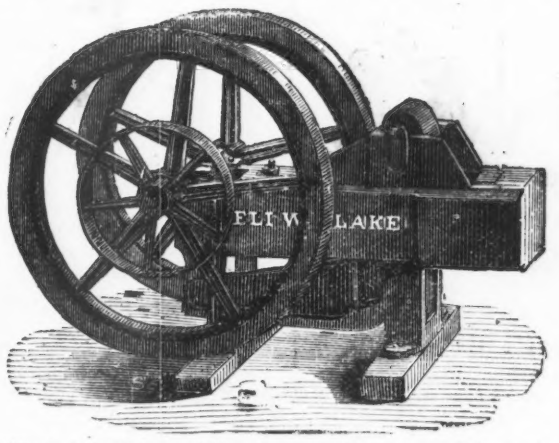

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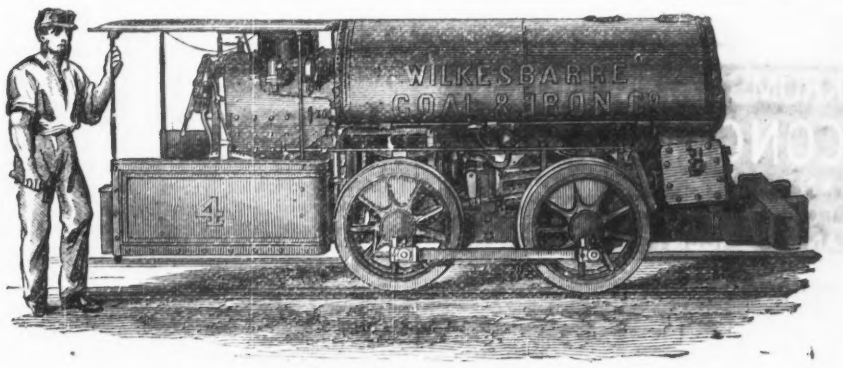

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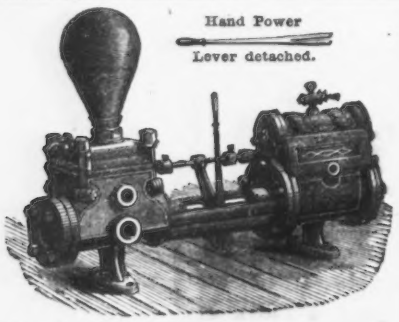

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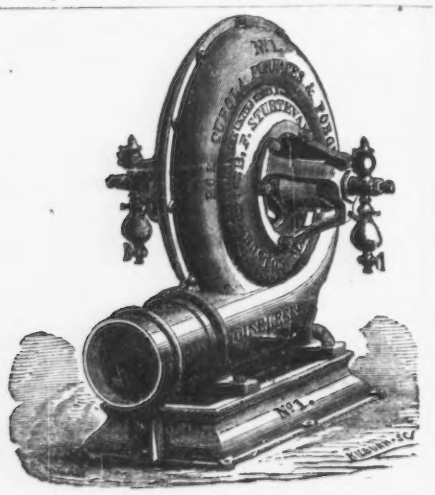

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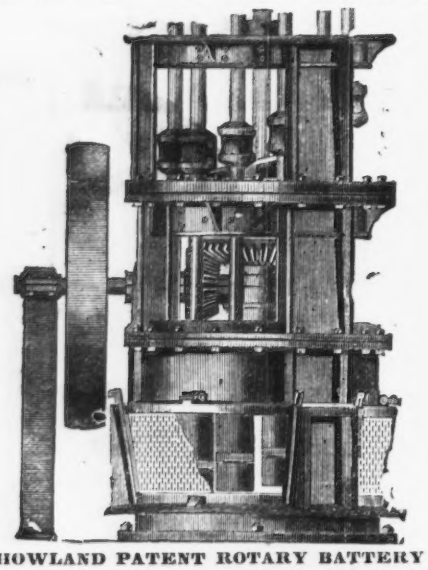

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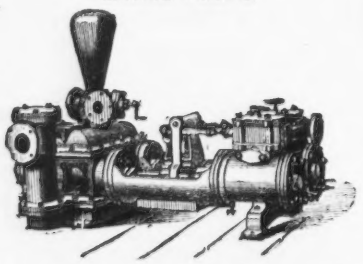

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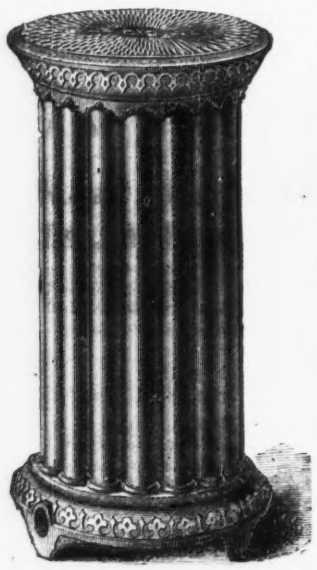

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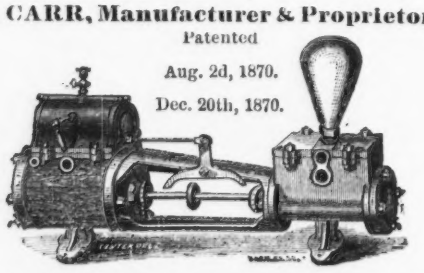

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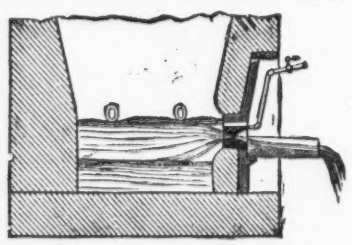

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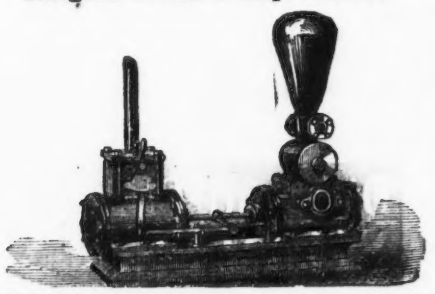

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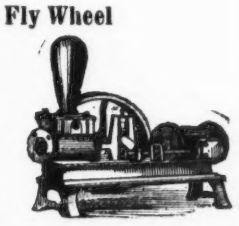

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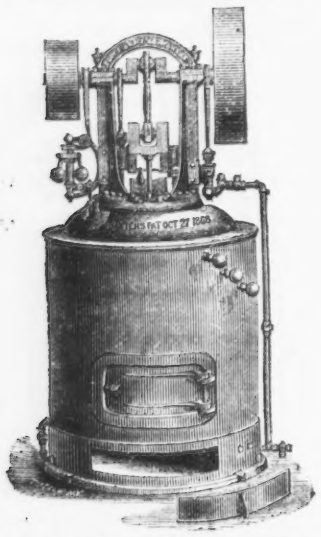

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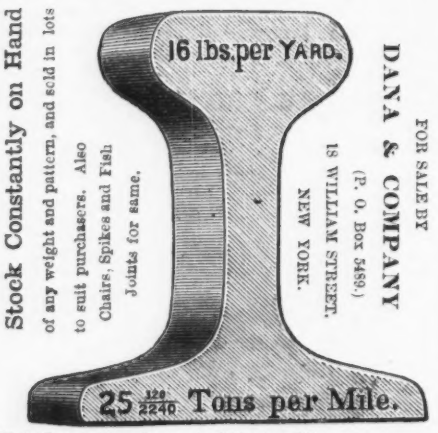
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